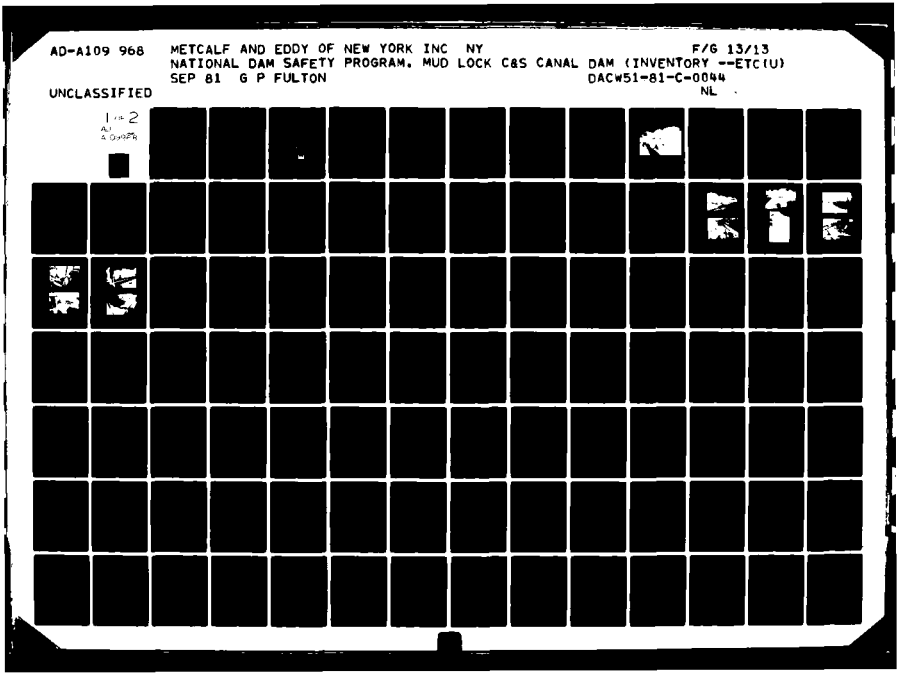
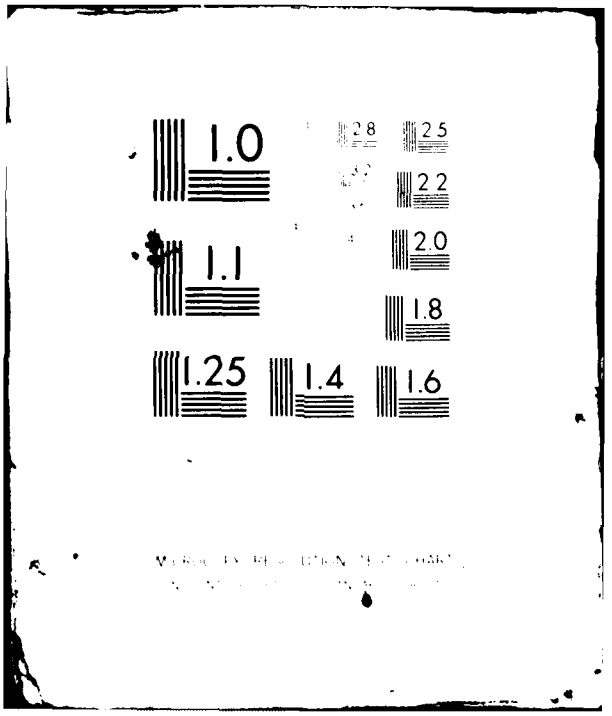
AD-A109 968 METCALF AND EDDY OF NEW YORK INC NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. MUD LOCK C&S CANAL DAM (INVENTORY --ETC(U)
SEP 81 G P FULTON DACW51-81-C-0044
UNCLASSIFIED NL




1.0
2.8
2.5
2.2
1.1
2.0
1.8
1.25
1.4
1.6

AD A1C9968

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO. AD A1C9968

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
Phase I Inspection Report
Mud Lock C&S Canal Dam
Oswego River Basin, Cayuga County, NY
Inventory No 416

5. TYPE OF REPORT & PERIOD COVERED
Phase I Inspection Report
National Dam Safety Program

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
GEORGE P. FULTON

LEVEL II

8. CONTRACT OR GRANT NUMBER(s)
DACW51-81-C-0044

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Metcalf and Eddy of New York, Inc.
60 East 42nd Street
New York, New York 10017

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
Department of the Army
26 Federal Plaza New York District, CofE
New York, New York 10287

12. REPORT DATE
14 September 1981

13. NUMBER OF PAGES

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)
Department of the Army
26 Federal Plaza New York District, CofE
New York, NY 10287

15. SECURITY CLASS. (of this report)
UNCLASSIFIED

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
Approved for public release; Distribution unlimited.

DTIC
JAN 25 1982
H

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Mud Lock C&S Canal Dam
Oswego River Basin
Cayuga County

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and visual inspection of the dam to [illegible] life or property, several [illegible] noted which should be evaluated and remedied.

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE

4-1-74

The hydraulic/hydrologic analysis performed indicates that the spillway has sufficient capacity to discharge the peak outflow from one-half the Probable Maximum Flood (PMF), but not from the full PMF. However, overtopping is not likely to result in failure of the dam. In any case, spillway discharges occurring during large storm events will cause flooding in downstream areas along the canal, regardless of an overtopping failure. Therefore the spillway is assessed as inadequate according to Corps of Engineers guidelines.

OSWEGO RIVER BASIN

MUD LOCK C&S CANAL DAM

CAYUGA COUNTY, NEW YORK
INVENTORY NO. NY 416

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST 1981

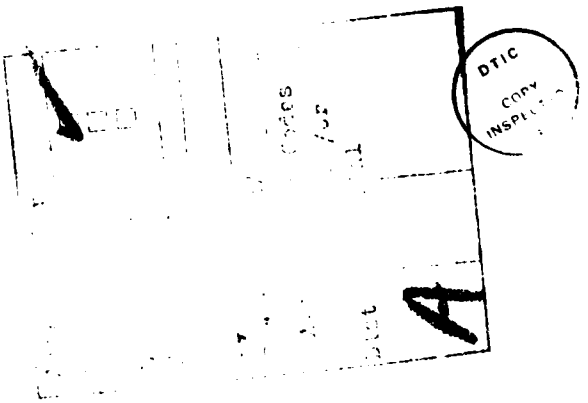
PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, and Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hudrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.



PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
MUD LOCK C&S CANAL DAM
I.D. NO. NY 416
64A-369
OSWEGO RIVER BASIN
CAYUGA COUNTY, NEW YORK

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Mud Lock C & S Canal Dam
State Located:	New York
County:	Cayuga
Watershed:	Oswego River Basin
Stream:	Seneca River
Date of Inspection:	July 7, 1981

Assessment

Examination of available documents and a visual inspection of this dam did not reveal any conditions which constitute an immediate hazard to human life or property. However, several deficiencies were noted which should be evaluated and remedied.

The hydraulic/hydrologic analysis performed indicates that the spillway has sufficient capacity to discharge the peak outflow from one-half the Probable Maximum Flood (PMF), but not from the full PMF. However, overtopping is not likely to result in failure of the dam. In any case, spillway discharges occurring during large storm events will cause flooding in downstream areas along the canal, regardless of an overtopping failure. Therefore the spillway is assessed as inadequate according to Corps of Engineers guidelines.

The most serious deficiency is the deteriorated condition of the concrete on the retaining walls and on the spillway piers. Cracks, spalling and efflorescence throughout the structure indicate the need for more thorough maintenance work. Since the condition of the submerged section of the piers and spillway sill could not be evaluated, dewatering of the area, followed by a thorough inspection of both the concrete and steel work, is recommended. In lieu of dewatering the area, an underwater inspection of the steel and concrete may be conducted. The investigation should be commenced within six months of the date of notification of the Owner. Remedial measures deemed appropriate as a result of the investigation should be completed within 12 months.

Other deficiencies as outlined below should be corrected within 12 months of the date of notification of the Owner:

1. Cracks and spalling on the concrete retaining walls, piers, and counterweights should be repaired.
2. All steel work on the superstructure should be sandblasted, primed and repainted where necessary, to prevent continued rusting and pitting.
3. All accumulated debris should be removed from the vicinity of the taintor gates.

4. The end seals on the taintor gates should be replaced.
5. The area of minor erosion behind the upstream retaining wall on the right embankment should be backfilled and reseeded.
6. Trees and brush growing on the crest of the left embankment, and on the downstream toe of both embankments should be removed.
7. An emergency action plan should be developed for the notification and evacuation of downstream residents.

Edward M. Greco, P.E.
Project Manager
Metcalf & Eddy of New York, Inc.
New York Registration No. 47463

George P. Fulton, P.E.
Vice President
Metcalf & Eddy of New York, Inc.
New York Registration No. 22390

Approved By:

Col. W. M. Smith, Jr.
New York District Engineer

Date: 14 Sep 87

OVERVIEW
MUD LOCK C&S CANAL DAM
NY ID NO. 416

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
MUD LOCK C&S CANAL DAM
OSWEGO RIVER BASIN
CAYUGA COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam

The Mud Lock Dam at Cayuga Lake is one of the many water level control structures on the New York State Barge Canal System. The Cayuga and Seneca Canal flows eastward from Seneca to Cayuga Lake. From Cayuga Lake water flows over the spillway at Mud Lock Dam into the Seneca River, and northward to the Erie Canal. Navigation Lock No. 1, which is situated east of the east abutment of the dam permits passage of barge and recreational water traffic into the lower Canal. An inspection of the lock was not included in the dam inspection program.

The dam consists of a spillway with concrete side walls and six bays of taintor gates separated by concrete piers. Earthfill embankments to the right and left of the spillway section are protected by vertical concrete retaining walls on the upstream and downstream sides. Beyond the toe of the walls the the earth embankment slopes at 4:1 (H:V).

The retaining walls tie into the abutments of the spillway structure. The walls and piers are founded on piles driven to the top of bedrock. The combined length of the spillway and embankments is approximately 500 feet. The maximum height of the dam is 20 feet at the abutments, downstream of the sill. The minimum height is 17 feet at the retaining walls.

The spillway section has a total length of 220 feet, and the effective length of the combined bays is 180 feet. The crest of the spillway is a concrete sill 39 feet wide at elevation (El) 371.5 (Barge Canal Datum). According to available drawings, the sill is founded on wooden piles driven to varying depths, with sheet piling driven at the upstream and downstream ends of the sill. A timber crib was constructed

immediately downstream of the spillway to prevent scour in the discharge channel.

Flow over the spillway from Cayuga Lake is controlled by the taintor gates. The gates can be opened independently using rack and pinion mechanisms mounted on each pier. At the highest position, each gate creates an effective vertical opening of 15.5 feet, which is approximately three feet above the normal navigation elevation of the lake. Counterweights consisting of reinforced concrete blocks facilitates manual operation of the gates.

Access to the piers and handwheels is via a wood and steel walkway located upstream of the gates. The only access to the dam and spillway is a walkway along the top of the mitre gates at Lock No. 1.

There is no other outlet at the dam (other than the lock). The remains of an abandoned fish ladder can be seen adjacent to the left abutment of the dam, but the waterway has been blocked by dumped fill.

b. Location

The dam is located off Mud Lock Road, approximately two miles north of the Town of Cayuga, New York, and one mile south of the intersection of Route 20 and the Cayuga and Seneca Canal.

c. Size Classification

The dam is a maximum 20 feet high, but due to the large size of Cayuga Lake, has a maximum storage capacity of over 770,000 acre-feet. Therefore, the dam is in the "large" size category as defined by the "Recommended Guidelines for Safety Inspection of Dams".

d. Hazard Classification

The dam is classified as high hazard due to the presence of a number of homes downstream on the east side of the Canal.

e. Ownership

The dam is owned by the New York State Department of Transportation (DOT). Mr. William Schollenberger, of the Waterways Maintenance Division in Albany, was contacted concerning design and construction of the dam. Mr. Richard H. Aldrich of the Regional Waterways Office, Region 3, was contacted for information regarding operating procedures and maintenance of the dam. The Region 3 office is located at 333 East Washington Street, Syracuse, New York, 13404 (telephone 315/473-8194).

f. Purpose of the Dam

The dam is used primarily to regulate the water level in Cayuga Lake and the Cayuga and Seneca Canal for navigation purposes. In addition, its purpose is to, 1) provide additional lake storage to prevent flooding during periods of high runoff in the watershed, 2) maintain a stable recreation level in the lake, and 3) maintain a minimum flow in the Seneca River in response to local water quality requirements.

g. Design and Construction History

The dam was constructed around 1912 for the New York State Department of Transportation, Canal Division, who also designed the structure. According to representatives of the DOT, there have been no major alterations to the structure since it was originally constructed. Shortly after construction a leakage problem was noted beneath the sill, and a section of wood and steel sheeting was driven upstream of the spillway as a cut-off. In 1973 the concrete sill at bay no. 1 (the east end of the spillway) was also regrouted through drill holes to prevent further seepage in this area.

1.3 PERTINENT DATA

a. Drainage Area (square miles) — 1,572

b. Discharge at Dam (cfs)

Spillway, water surface at retaining wall	34,392

c. Elevation (Barge Canal Datum at Mud Lock, equal to Mean Sea Level + 1.32 ft.)

Top of Dam (at retaining wall)	387.2
Crest of spillway (sill)	371.5
Original streambed	370 (approx)

d. Reservoir - Surface Area (Acres)

Top of Dam	42,240
Crest of spillway	42,240

e. Storage Capacity (acre-feet)*

Top of Dam	663,000
Design Pool Elevation	528,000
Crest of spillway (sill)	0

f. Embankment

Type: Earthfill with vertical concrete retaining walls adjacent to spillway; 4:1 (H:V) slopes on embankment beyond limits of walls, upstream and downstream

Dam Length (ft):	500
Crest width (ft);	85 (maximum at spoil bank area, right embankment)
Height: varies;	20 ft. maximum

g. Spillway

Type: Six bays of taintor gates on concrete sill, operated by hand wheels.

Length of weir:	220 feet (total)
	180 feet (effective length)

h. Low-level outlets

none

i. Appurtenant Structures

Navigation Lock No. 1, adjacent to right (east) abutment of dam.

*usable storage - does not include storage in Cayuga Lake below sill elevation

SECTION 2: ENGINEERING DATA

2.1 Geotechnical Data

a. Geology

Mud Lock Dam is located in the Finger Lakes Region, within the Ontario Lowland physiographic province of New York State. The province generally consists of a relatively low, flat-lying area which rises in elevation from Lake Ontario southeastward to the boundary with the Appalachian Uplands province. The Ontario Lowland is crossed by at least three major east-west trending escarpments formed by relatively resistant ridges of limestone and dolomite, which are in turn interbedded with less resistant shale units forming the lowland areas. Mud Lock Dam is located north of the escarpment formed by the Onondaga Limestone of Lower Devonian age. The area in the vicinity of the dam is underlain chiefly by Camillus shale of upper Silurian age.

Available publications do not indicate the presence of any faulting in the bedrock in the vicinity of the dam.

Depth to bedrock ranges from approximately 10 to 40 feet in the area of the navigation lock, based on available test borings. Overburden materials consist of gravel, sand, silt and clay that were deposited during and since the period of Pleistocene glaciation. The borings also show 4 to 6 feet of muck overlying the granular deposits.

b. Subsurface Investigations

Two drawings showing test borings and soil profiles along the Lock No. 1 canal were reviewed for this project.

2.2 DESIGN RECORDS

Some design drawings dated 1910 and 1912 were available at the Department of Transportation office in Albany. Several plans showing details on the embankments, spillway, and taintor gates were reviewed, and the more pertinent drawings are included in Appendix E.

2.3 CONSTRUCTION RECORDS

No construction records concerning the original construction of the dam were located.

2.4 OPERATION RECORDS

The dam is operated by personnel of the Department of Transportation, Waterways Division. The chief lock operator also regulates the position of the taintor gates as instructed by the DOT Region 3 office. Daily records of lake elevation and spillway discharge are kept by the operator and are available at the Regional office.

2.5 EVALUATION OF DATA

The data used for the preparation of this report was obtained from the New York State Department of Transportation. The available information appeared to be accurate.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of Mud Lock Dam was conducted on July 7, 1981. The weather was sunny with the temperature in the 80's. The water level at the time of the inspection was at El. 383.5, Barge Canal Datum, which is one-half foot below the top of the closed taintor gate.

b. Embankment

The grass cover on the right embankment was recently cut, which facilitated inspection of this side of the dam. The crest is relatively flat, with no apparent irregularities on the surface. Minor soil erosion due to runoff was noted behind the upstream retaining wall of the right abutment. Some vegetation is growing on the riprap slopes upstream and downstream of the retaining walls.

The left embankment is overgrown with brush, and the contact between the abutment and the abandoned fish ladder could not be distinguished. Gravel fill has been dumped into the fish ladder, which is now partially overgrown with vegetation. The only seepage noted on either the right or left embankment was through the fill in the fish ladder. Any seepage which may occur through the rest of the embankment would not be detected due to the tailwater.

The concrete side walls and the retaining walls, upstream and downstream, are in fair condition. Vertical construction and/or expansion joints have opened up at several places along the wall, particularly on the right embankment. Severe spalling is occurring in these areas, as well as along the upper edge of the upstream wall and along the entire surface of the downstream wall leading to the taintor gates. Heavy efflorescence was also noted on the walls.

c. Spillway

The spillway is in fair to poor condition, with the major deficiency being the deterioration of the concrete piers. Heavy spalling occurs on the tops of the piers, particularly toward the center of the spillway and at the gate bearing points. Efflorescence was noted through horizontal fractures in the sides of the piers, with minor amounts of vegetation growing in the cracks. The lower two-thirds of the piers, and the sill, could not be inspected due to the tailwater elevation. The submerged portion of the piers and sill was reportedly inspected in 1973 by towing a cofferdam barge upstream of the spillway and thereby cutting off the flow. Substantial leakage beneath the sill was reported in the 1973 Condition Report, which is included in Appendix E.

The rack and pinion mechanisms which operate the taintor gates appear to be in good condition, with only minor amounts of rust in some areas. Parts of the superstructure on the taintor gates have been recently painted, however, rust is visible in other areas of the beams. The steel plates on the downstream side were also rusted. The upstream side of the gates were submerged. All six counterweights on the taintor gates showed

heavy spalling on the lower corners. Five of the weights had horizontal fractures running along their entire length. In some places the fractures were as much as 3/4-inches wide.

At the time of the inspection, two of the six taintor gates were slightly open to permit a minimum flow of 200 cfs into the Seneca River. Heavy leakage was occurring around the end seals of three of the gates.

A significant accumulation of tree limbs and debris was noted on the upstream side of two of the gates. In addition, debris including several large tree trunks were caught in the lower part of the superstructure on the downstream side of the gates. Some of the debris appears to have been there long enough to sustain the growth of minor amounts of vegetation among the steel work.

d. Downstream Channel

The channel downstream of the spillway is wide and generally free from debris and overhanging trees. Part of the timber cribbing placed to prevent scour at the toe of the spillway was visible below the water surface, and appeared to be intact.

e. Reservoir Area

Cayuga Lake is approximately 35 miles long. However, due to the presence of a railroad causeway upstream of the dam, the fetch is only slightly more than one mile. There were no visible signs of instability or sedimentation problems on the perimeter within this immediate area, which consisted chiefly of low-lying vegetated marsh and woodland.

3.2 EVALUATION OF OBSERVATIONS

Visual inspection of this dam revealed the following deficiencies:

1. Heavy spalling, cracking, and efflorescence of the concrete on both the retaining walls on the embankment and the side walls, piers and counterweights on the spillway.
2. Rusted steel work on the taintor gates.
3. Heavy accumulation of debris both upstream of the gates, and lodged within the superstructure downstream of the plates.
4. Leakage around the side and bottom seals of the taintor gates.
5. Minor erosion of the soil on the earth embankment, behind the upstream retaining wall.
6. Minor growth of vegetation on the slopes beyond the retaining walls.

The reported periodic leakage under the sill could not be examined or evaluated.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

Cayuga Lake is used for recreation and is part of the New York Barge Canal System controlled by the Department of Transportation. The flow of water out of the Lake and into the Seneca River is controlled by the taintor gates. The Region 3 office of the DOT gives daily instructions to the chief lock operator for operating the gates. A minimum flow of 200 cfs is maintained in the Seneca River at all times. Maximum elevation of the Lake for navigation purposes is 384.0, Barge Canal Datum at Mud Lock. Lake level is maintained within a range of 5 feet throughout the year, with the minimum level occurring during periods of high runoff in December, January and February. The purpose is to provide additional storage and thereby avoid flooding problems during the spring thaw.

4.2 MAINTENANCE OF DAM

The dam is maintained by the Department of Transportation. Grass mowing and other routine maintenance is performed by the lock operator and his staff as required. Biannual maintenance inspections are reportedly made by the regional maintenance crew. In addition, technical inspections of the structure have been made every two years since 1973 by DOT personnel. Copies of these inspection reports are included in Appendix E.

4.3 WARNING SYSTEM IF EFFECT

There is no warning system for notification and evacuation of downstream residents.

4.4 EVALUATION

The operation procedures on this structure are satisfactory. However, increased maintenance efforts are required to correct the deficiencies noted in Section 3.2.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

The drainage area to Mud Lock Dam is 1572 square miles (1,006,000 acres) as indicated on the map entitled "Oswego River Watershed" (Appendix F). The topography in the watershed changes from relatively flat and low-lying land in the northern part, to hilly terrain deeply incised by innumerable tributary streams in the southern portion. Elevations in the watershed range from 500 feet above mean sea level in the north, to over 1900 feet in the south.

This extensive watershed is generally comprised of rural, wooded and agricultural land. Areas of major development include the cities and towns of Geneva, Seneca Falls, and Ithaca.

The largest tributary into Cayuga Lake is Fall Creek, which flows westerly through Ithaca. In addition, Keuka and Seneca Lakes are hydraulically connected to Cayuga Lake by the Barge Canal System at the north end of the lake.

5.2 ANALYSIS CRITERIA

The large size of the watershed had to be considered in conducting the hydraulic analysis. For this reason the Probable Maximum Precipitation (PMP) was applied to three subareas of the watershed as follows: 1) rainfall directly on the lake surface, 2) runoff from the shorter tributary streams directly connected to the lake, and 3) runoff from the larger streams in the watershed, such as Fall Creek and the Cayuga-Seneca Canal. The three hydrographs were combined at the dam, and the total inflow was routed through Cayuga Lake in order to determine the peak discharge.

The hydraulic analysis assumes that for Keuka and Seneca Lakes the storage capacity in relation to watershed area is similar to that in Cayuga Lake. Therefore, the peak flow through the Cayuga-Seneca Canal into Cayuga Lake is insignificant when compared to the direct runoff into the lake. The results of the hydraulic analysis show that for runoff into Cayuga Lake an initial peak flow is a result of the rainfall directly on the lake. A second, higher peak occurs later when the runoff from the minor tributaries and remainder of the watershed reaches the dam.

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corp of Engineers HEC-1 computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 19.0 inches (24 hrs., 200 sq. miles) from Hydrometeorological Report #33, in accordance with recommended guidelines of the Corps of Engineers. The floods selected for analysis were 50 and 100 percent of the Proabale Maximum Flood (PMF) flows. The PMF inflow of 3 3,360 cfs was routed through the reservoir and the peak outflow was determined to be 67,760 cfs. The one-half PMF inflow and routed outflow were 163,180 cfs and 30,850 cfs, respectively.

5.3 SPILLWAY CAPACITY

The spillway consists of a concrete sill with six bays of taintor gates separated by concrete piers. The effective length of the combined bays is 180 feet. The retaining walls on the embankment are at El 387.2, which is 15.7 feet above the elevation of the sill. With the taintor gates completely open, spillway capacity to the top of the wall is 34,392 cfs. This is assuming no tailwater effect caused by flooding streams downstream of the dam.

5.4 RESERVOIR CAPACITY

The normal water surface is maintained at a maximum elevation of 384 (Barge Canal Datum) for navigational purposes. Cayuga Lake has a surface area of 66 square miles, and a maximum depth of 431 feet. However, for the hydraulic analysis, only the usable storage, above the elevation of the spillway sill (371.5) was considered. The effective impounding capacity at El 384 is therefore 528,000 acre-feet. Surcharge storage capacity to the top of the retaining walls (El 387.2) adds 135,000 acre-feet, which is equivalent to a direct runoff depth of 0.1 inch over the entire watershed. The total calculated usable storage is 663,000 acre-feet.

5.5 FLOODS OF RECORD

The maximum known discharge at the site of the dam was 10,004 cfs on July 10, 1935. As a result of Hurricane Agnes in 1972, the water level in the lake reached El 387.5, with a discharge rate of 9422 cfs flowing through the spillway. The positions of the taintor gates during this flood period are unknown.

5.6 OVERTOPPING POTENTIAL

The analyses indicated that with the taintor gates open, the spillway has sufficient capacity to discharge the flow from a one-half PMF storm event, but not from the full PMF. The computed depth of overtopping for the full PMF storm is 3.9 feet over the retaining wall. All storm events exceeding 60 percent of the PMF will result in the dam being overtopped.

5.7 EVALUATION

The hydrologic/hydraulic analysis indicated that the spillway does not have sufficient capacity to discharge the peak outflow from the full PMF. During the peak flow, the earth embankments of the dam will be overtopped. Due to the presence of the concrete retaining walls on the embankments, failure of the dam as a result of overtopping is unlikely to occur. However, during large storm events, increased spillway discharge and overtopping will result in flooding along the downstream canal regardless of an overtopping failure. Therefore, the spillway is assessed as inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual inspection of the left (west) embankment and portions of the upstream slope of the right embankment was hindered by brush and trees growing in these areas. The crest of the right embankment was grass-covered and well maintained.

No areas of instability or active seepage were noted on the right embankment. Any seepage which may occur beneath the spillway could not be detected due to the tailwater. The crest of the left embankment was irregular, and covered with brush. The only seepage visible in this area was occurring through the fill that has been dumped into the abandoned fish ladder.

b. Design and Construction Data

Design drawings dated 1910 and 1912 are available from the DOT office in Albany. Pertinent drawings have been included in Appendix E. No other design data, specifications, or computations, and no construction records, were available.

c. Seismic Stability

The structure is located in seismic zone 2. No seismic stability analysis was performed.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of Mud Lock Dam revealed the following conditions:

1. Deterioration of the concrete on the side walls, piers and retaining walls of the spillway and embankments.
2. Rusting of the steel superstructure on the spillway.
3. Heavy accumulation of debris both upstream of the taintor gates, and within the superstructure.
4. Minor growth of vegetation of the crest of the left embankment, and at the downstream toe of both embankments.

The spillway capacity is inadequate for the peak outflow from the Probable Maximum Flood (full PMF). However, overtopping of the embankments is not likely to result in failure of the dam. In any case, spillway discharge during the peak flood will cause flooding in downstream areas regardless of an overtopping failure. Therefore, the spillway is assessed as inadequate, but not seriously inadequate.

b. Adequacy of Information

The plans which were available for the preparation of this report were fairly complete and appeared to be accurate. However, no detailed post-construction information was available for the inspection. In additon, information of the design of the embankments and the nature of the fill was not available.

c. Need for Additional Investigations

It is recommended that a thorough examination be made of the submerged portions of the spillway to determine the condition of the concrete, particularly at the base of the piers, and the condition of the skin plates on the gates, and to evaluate any possible seepage which may still be occurring beneath the sill. The downstream areas of the embankment should by inspected after they are cleared of brush and trees.

d. Urgency

The investigation of the dewatered spillway section and embankment areas should be undertaken withing six months of the date of notification of the Owner. Remedial measures deemed appropriate as a result of the investigation should be complete with 12 months.

Other deficiencies as outlined below should be corrected within 12 months of the date of notification of the Owner.

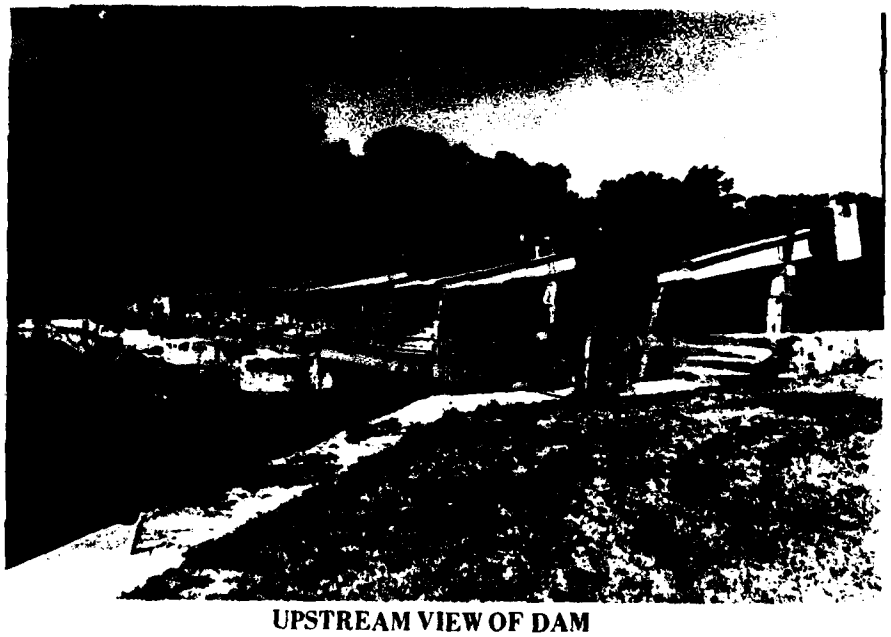
7.2 RECOMMENDED MEASURES

a. Cracks and spalling on the visible portions of the concrete retaining walls, piers, and counterweights should also be repaired.
b. All steel work on the superstructure should be sandblasted, primed and repainted where necessary, to prevent continued rusting and pitting.

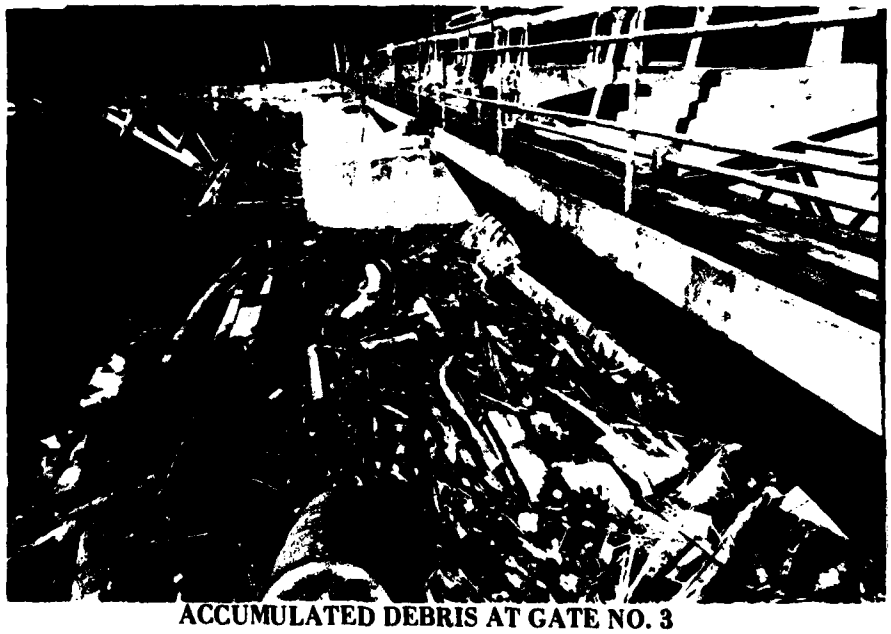
c. All accumulated debris should be removed from the vicinity of the taintor gates.
d. The end seals on the taintor gates should be replaced.
e. The area of minor erosion behind the upstream retaining wall on the right abutment should be backfilled and reseeded.
f. Trees and brush growing on the crest of the left embankment, and on the downstream toe of both embankments should be removed.
g. An emergency action plan should be developed for the notification and evacuation of downstream residents.

APPENDIX A

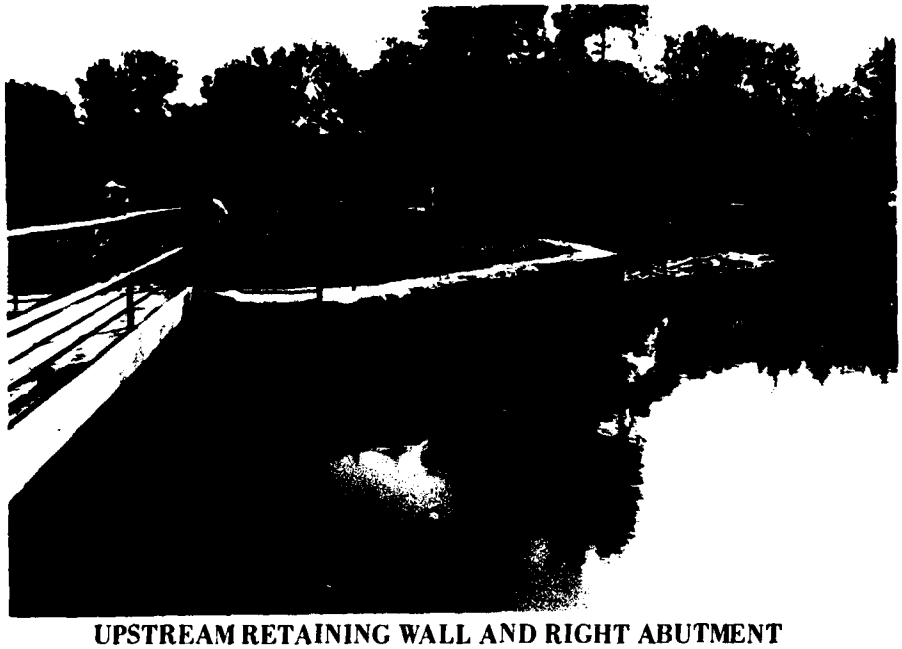
PHOTOGRAPHS



UPSTREAM VIEW OF DAM

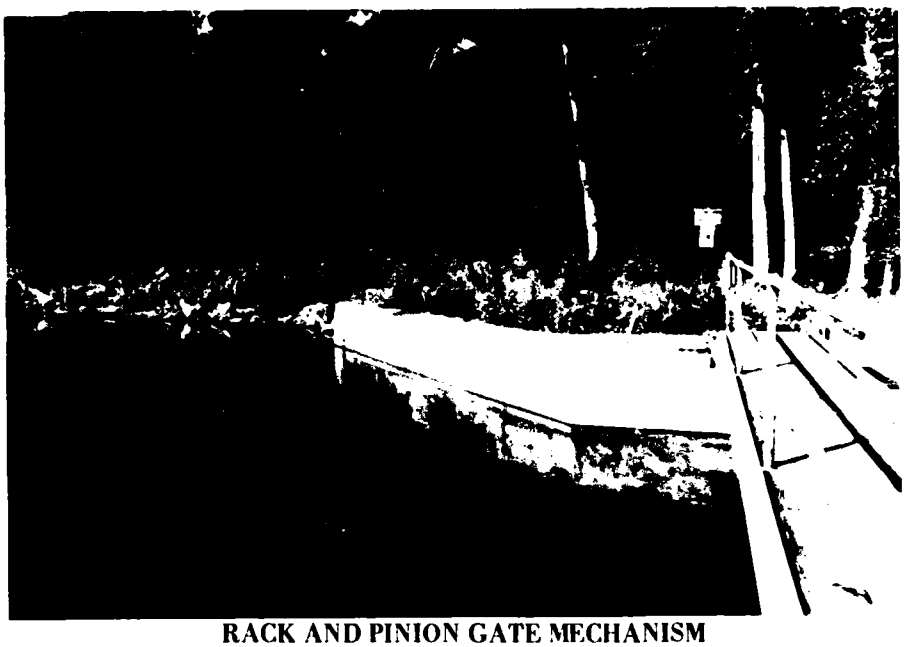


ACCUMULATED DEBRIS AT GATE NO. 3



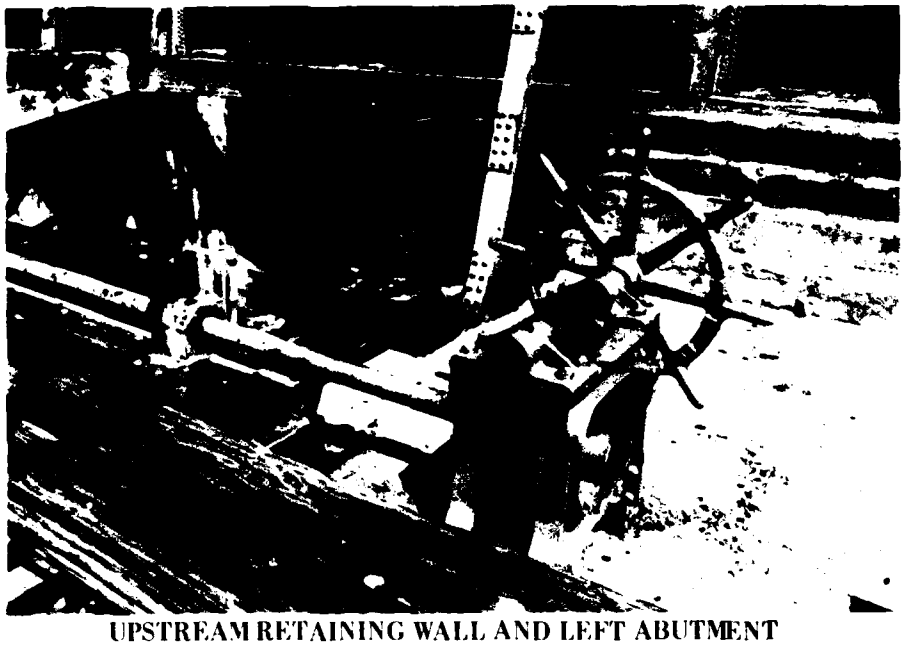
UPSTREAM RETAINING WALL AND RIGHT ABUTMENT

DOWNSTREAM RETAINING WALL AT RIGHT ABUTMENT



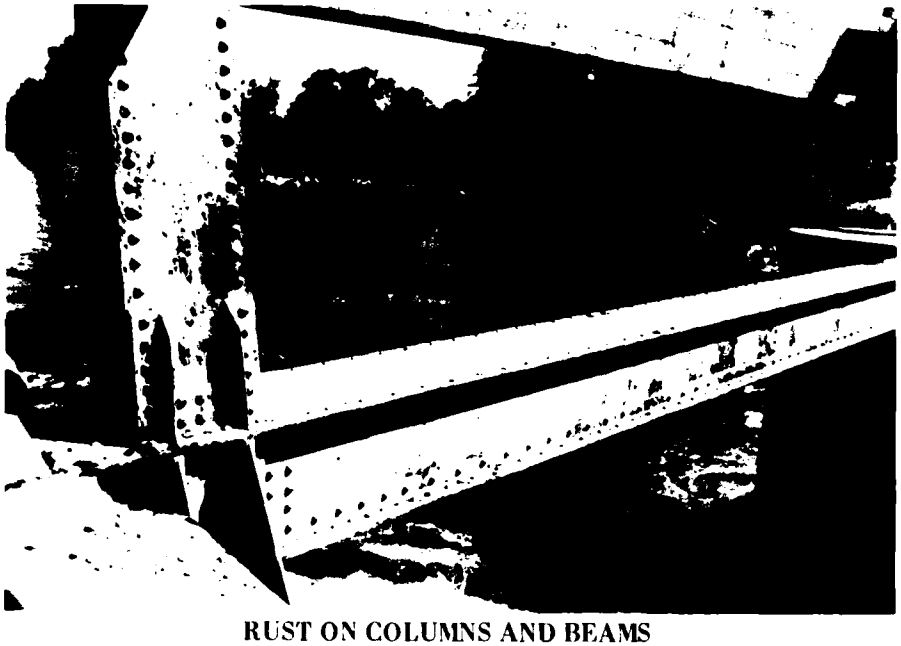
RACK AND PINION GATE MECHANISM

TAINTOR GATE (OPENED APPROXIMATELY 3 INCHES)

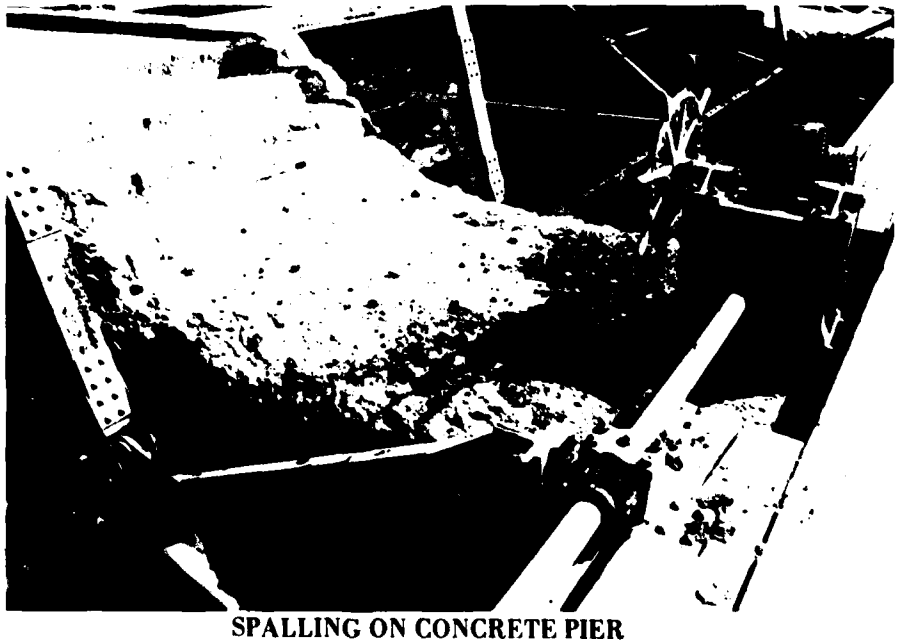


UPSTREAM RETAINING WALL AND LEFT ABUTMENT

DOWNSTREAM RETAINING WALL AT LEFT ABUTMENT AND ABANDONED FISH LADDER



RUST ON COLUMNS AND BEAMS



SPALLING ON CONCRETE PIER

APPENDIX B

VISUAL INSPECTION CHECKLIST

93-15-3(9/80)

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Mud Lock C+S Canal Dam

Fed. I.D. # NY 416 DEC Dam No. 64A-369

River Basin Oswego

Location: Town Cayuga County Cayuga

Stream Name Seneca River

Tributary of Oswego River

Latitude (N) 42° 56.3' Longitude (W) 76° 43.2'

Type of Dam taintor-gate spillway with earth abutments and concrete retaining walls

Hazard Category C - High

Date(s) of Inspection July 7, 1981

Weather Conditions sunny, 80°

Reservoir Level at Time of Inspection 383.5 Barge Canal Datum

b. Inspection Personnel Metcalf + Eddy: Susan Pierce, Reginald Barron, Carol Sweet, William Checchi; NY DOT: Richard Aldrich

c. Persons Contacted (Including Address & Phone No.)

Richard H. Aldrich, Regional Waterways Office, Region 3, 333 East Washington Street, Syracuse, N.Y., 13202 (315/473-8194)

William Schollenberger, New York State DOT, 1220 Washington Ave, State Campus, Albany, New York 12232

d. History:

Date Constructed 1912 Date(s) Reconstructed -

Designer New York State Canal Department

Constructed By unknown

Owner New York State Department of Transportation

93-15-3(9/80)

2) Embankment

a. Characteristics

(1) Embankment Material soil at both abutments; concrete retaining walls filled with earth

(2) Cutoff Type wood and steel sheeting driven upstream of spillway sill - see drawings

(3) Impervious Core —

(4) Internal Drainage System none

(5) Miscellaneous —

b. Crest

(1) Vertical Alignment good

(2) Horizontal Alignment good

(3) Surface Cracks on retaining walls: joints opened up at corners, minor spalling on top of wall, moderate on upstream face

(4) Miscellaneous no appearance of differential movement in piers; vegetation on left embankment obscurs crest

c. Upstream Slope

(1) Slope (Estimate) (V:H) vertical retaining walls, 1:4 rockfill slope beyond walls

(2) Undesirable Growth or Debris, Animal Burrows none visible; no animal burrows noted

(3) Sloughing, Subsidence or Depressions At upstream retaining wall, right embankment: runoff erosion through open corner joint flows back into Lake Cayuga

(4) Slope Protection some broken rock (riprap) submerged on upstream slope, beyond retaining wall

(5) Surface Cracks or Movement at Toe none visible (submerged)

d. Downstream Slope

(1) Slope (Estimate - V:H) vertical retaining wall; 1:4 spoil bank beyond wall

(2) Undesirable Growth or Debris, Animal Burrows vegetation growing on downstream riprap slope below retaining wall

(3) Sloughing, Subsidence or Depressions none visible; surface runoff has eroded soil along right end of retaining wall, right embankment

(4) Surface Cracks or Movement at Toe vertical joint has opened on corner at right (east) wall - severe spalling

(5) Seepage none at dam (none noted due to tailwater). Minor clear seepage occurring through dumped fill in abandoned fish ladder

(6) External Drainage System (Ditches, Trenches; Blanket) N/A

(7) Condition Around Outlet Structure N/A. see spillway section

(8) Seepage Beyond Toe none visible due to tailwater

e. Abutments - Embankment Contact

Concrete retaining walls tie into soil embankment; also tie into side walls of spillway structure

93-15-3(9/80)

(1) Erosion at Contact minor erosion due to surface runoff at upstream corner of right abutment

(2) Seepage Along Contact none

3) Drainage System

a. Description of System none visible

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) None

93-15-3(9/80)

5) Reservoir

a. Slopes low slopes, natural marsh vegetation; east side of Lake is vertical retaining wall, which is approach channel to navigation lock

b. Sedimentation none visible

c. Unusual Conditions Which Affect Dam Although Lake is approximately 35 miles long, fetch to dam is less than 1 mile due to RR causeway upstream in Lake

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) approximately 30 homes along C+S Canal, wildlife refuge, Rte 20, agricultural land

b. Seepage, Unusual Growth none visible (tailwater)

c. Evidence of Movement Beyond Toe of Dam none

d. Condition of Downstream Channel good - wide channel, few overhanging trees. Periodic dredging (maximum 10-yr. interval) done at confluence of discharge channel with C+S canal, approx. 3500' downstream

7) Spillway(s) (Including Discharge Conveyance Channel)

Concrete spillway section: 6 taintor gates between concrete piers

a. General gates hand operated by rack and pinion equipment; concrete counterweights

b. Condition of Service Spillway Fair condition - note degree of spalling of concrete, and condition of steel framework for taintor gates

Condition of concrete sill and downstream channel could not be inspected. Piers and sill reportedly on piles, not bedrock. (see drawings)

c. Condition of Auxiliary Spillway No auxiliary spillway

d. Condition of Discharge Conveyance Channel see 7.b.

8) Reservoir Drain/Outlet Not Applicable

Type: Pipe _____ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable _____

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

9) Structural

a. Concrete Surfaces Moderate to severe spalling on concrete piers, both upstream and downstream, particularly on edges and corners. Heavy efflorescence on pier walls within each bay.

b. Structural Cracking Minor cracking, generally horizontal along pier walls. Horizontal cracks also noted on counterweights, which are also spalled at lower corners.

c. Movement - Horizontal & Vertical Alignment (Settlement) none noted

d. Junctions with Abutments or Embankments junctions appear to be sound

e. Drains - Foundation, Joint, Face none

f. Water Passages, Conduits, Sluices abandoned fish ladder at left abutment, partially backfilled. Some clear seepage noted through fill

g. Seepage or Leakage leakage visible around end seals of taintor gates. seepage beneath sill has been reported in old inspection records since completion of construction

h. Joints - Construction, etc. construction joints on corners of retaining walls have opened

i. Foundation submerged - see drawings

j. Abutments no visible reinforcing in concrete.

k. Control Gates superstructure in good condition except for minor rust and pitting. Some debris accumulating in framework.

l. Approach & Outlet Channels upstream channel filled with debris at gates; below gates downstream channel fairly clear

m. Energy Dissipators (Plunge Pool, etc.) none apparent. Timber cribbing filled with stone installed downstream of spillway to prevent scour in this area of channel

n. Intake Structures none

o. Stability good

p. Miscellaneous —

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition Navigation Lock No. 1 adjacent to right (east) abutment of dam. Chief lock operator maintains and operates locks and taintor gates as required. No gate house or power house as part of dam appurtenances

11) Operation Procedures (Lake Level Regulation):

Lake level is maintained for navigational purposes. Maximum desirable lake level is 384.0, Barge Canal Datum at Mud Lock*. Minimum flow in Seneca River is maintained at 200 cfs. Gates operated as needed to maintain these conditions. Lake level lowered during late winter to provide additional storage in the event of heavy runoff.

* Barge Canal Datum = Mean sea Level plus 1.32 feet

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	389.8	42,240	663,168
2) Design High Water (Max. Design Pool)	384	42,240	528,000
3) Auxiliary Spillway Crest	–	–	–
4) Pool Level with Flashboards	–	–	–
5) Service Spillway Crest	371.5	42,240	0 (usable storage)

DISCHARGES

	Volume (cfs)	
1) Average Daily	200 cfs	
2) Spillway @ Maximum High Water	34392	
3) Spillway @ Design High Water	24500	
4) Spillway @ Auxiliary Spillway Crest Elevation	–	
5) Low Level Outlet	–	
6) Total (of all facilities) @ Maximum High Water	34392	
7) Maximum Known Flood	10,004 cfs	, July 10, 1935
8) At Time of Inspection	196 cfs	

CREST: ELEVATION: 389.8 at side wall 387.2 at earth embankment

Type: earthfill, with concrete retaining walls

Width: 85 max. (at spoil bank) Length: 500 feet (including spillway)

Spillover —

Location

SPILLWAY:

SERVICE		AUXILIARY
371.5 (sill) 384 (top of closed gates)	Elevation	No auxiliary spillway
concrete - taintor gates	Type	—
180 feet (effective width)	Width	—
	Type of Control	
no	Uncontrolled	—
	Controlled:	
taintor gates	Type (Flashboards; gate)	—
six	Number	—
30 feet	Size/Length	—
	Invert Material	—
permanent	Anticipated Length of operating service	—
—	Chute Length	—
approx 2'	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	—

HYDROMETEROLOGICAL GAGES:

Type : Continuous recording precipitation gage - Records sent to National Climatological Center

Location: Lock # 1 at Cayuga Outlet

Records: available at Syracuse - Region 3 office

Date - -

Max. Reading - -

FLOOD WATER CONTROL SYSTEM:

Warning System: no formal warning system. Report rainfall events greater than 1" to National weather service for flash flood warnings

Method of Controlled Releases (mechanisms):

rack and pinion mechanisms (six) - hand operated, one per taintor gate.

DRAINAGE AREA: 1572 square miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: rural / agricultural

Terrain - Relief: very steep, particularly in southern half of watershed

Surface - Soil: glacial deposits

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

Potential Sedimentation problem areas (natural or man-made; present or future)

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: Montezuma Marsh - NW of dam

Elevation: approx. 385 (MSL)

Reservoir: Cayuga Lake

Length @ Maximum Pool 35 (Miles)

Length of Shoreline (@ Spillway Crest) 74 (Miles)

Project NY Cal E PHI DAM INSP Acct. No. 7594 Page 1 of

Subject Mud Lock Dam Compld. By M. Nowak Date 8-20-81

Detail Ck'd. By Date

DRAINAGE AREA: The total drainage area of Cayuga Lake is 1572 sq mi, 749 sq mi. of which drain into Seneca Lake. The remaining 823 sq mi drain into Cayuga Lake and therefore will be used to calculate the runoff.

Furthermore, the drainage area will be subdivided into 3 sections

① area associated with principle stream
② " " " shorter streams
③ the Lake surface.

Lake area = 66 sq mi
Area of principle stream drainage ≃ 40% land area

$(.40)(823-66)$ sq mi = 302.8 sq mi

Area of shorter streams

$823-66-302.8 = 454.2$ sq mi

WATERSHED PARAMETERS

① Lake surface. To calculate the runoff, Snyder's method uses the equation

$$q_p = \frac{C_p\, 640}{t_p}.$$

Because rainfall onto the water surface equals the total surface runoff and one inch of runoff per hour from one square mile equals 640 cfs., then C_p and t_p must both be unity to eliminate them as factors in the conversion of rainfall to runoff.

(Reference: "Synthetic Unit-Graphs" by Franklin F. Snyder Transactions, American Geophysical Union, Hydrology, 1938)

② Principal stream
Snyder Unit Hydrograph
Lag time

$$t_p = C_t (L L_c)^{0.3}$$

$$= 2.0 (34.14)^{0.3} = 12.71 \text{ hrs.}$$

Unit rainfall duration

$$t_r = t_p / 5.5$$

t_r = 12.71/5.5 = 2.31 hrs.

adjusted t_R = 2 hrs.

Adjusted Lag Time

$t_{PR} = t_p + 0.25 (t_R - t_r)$

$= 12.71 + 0.25 (2 - 2.31) = 12.63$ hrs.

③ Shorter Streams

Lag time

$t_p = C_t (LL_c)^{0.3}$

$= 2.0 (16.8)^{0.3} = 8.57$ hrs

Unit rainfall duration

$t_r = t_p/5.5$

$= 8.57/5.5 = 1.56$ hrs

adjusted t_R = 2 hrs

Adjusted lag time

$t_{PR} = t_p + 0.25 (t_R - t_r)$

$= 8.57 + 0.25 (2 - 1.56) = 8.68$ hrs

BASE FLOW

① Lake Surface - base flow is zero

② Principal stream -
Seneca River gage at Cayuga inlet near Ithaca
04233000
average flow is 47 cfs

Using other dam inspection reports, RTIOR = 1.5
and QRCSN = 15%

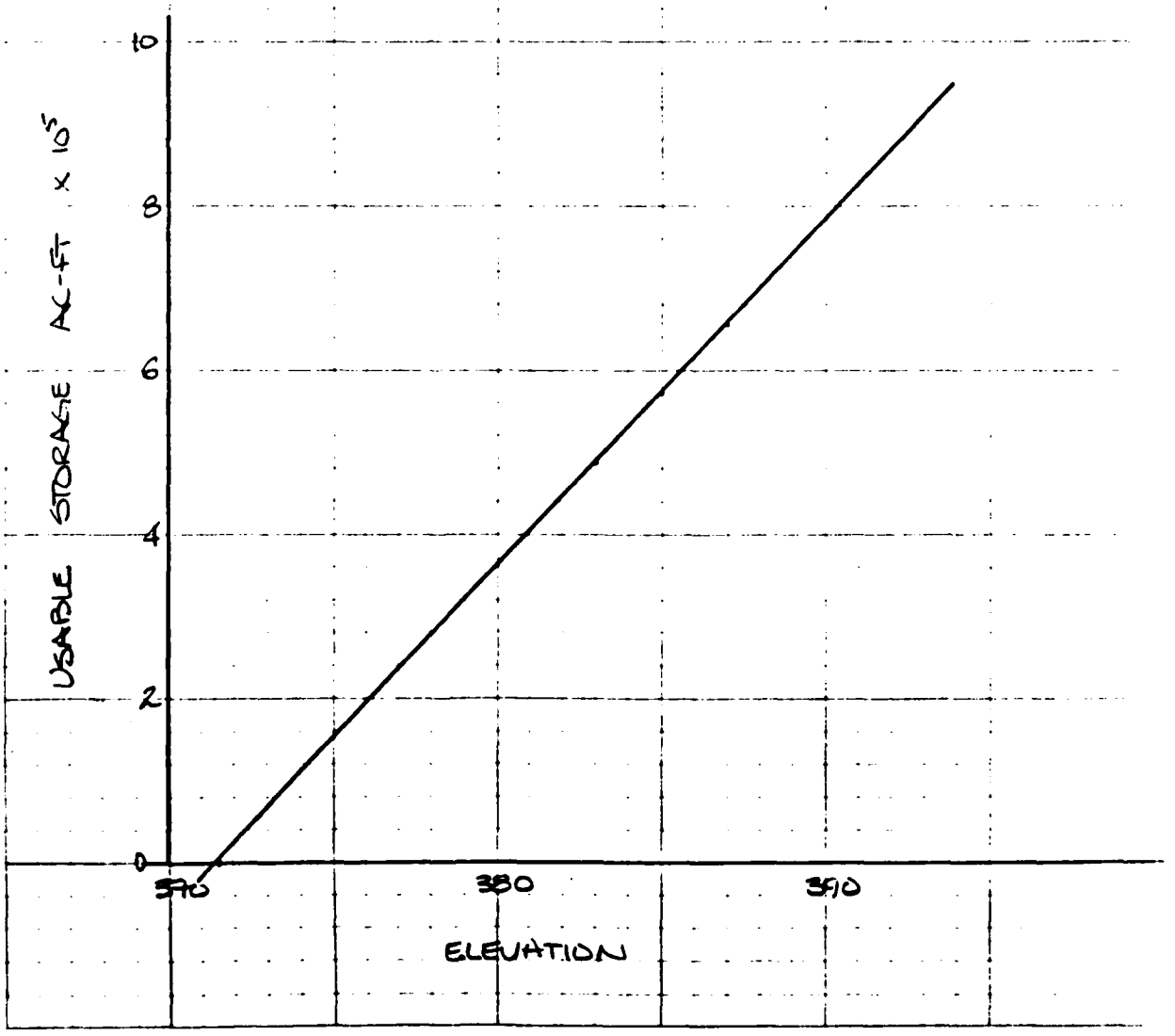
Project NY C&E Ph 1 DAM INSP Acct. No. 7594 Page 3 of
Subject Mud Lock DAM Comptd. By M. Nowak Date 8-21-81
Detail Ck'd. By Date

NONREPRODUCIBLE GRID FORM 143

③ Shorter streams - Using the Seneca River gage at Cayuga Inlet near Ithaca 04233000 Runoff is 1.33 csm

The average drainage area for a short stream is 1 sq mi, so the base flow is 1.3 cfs. Using other dam inspection reports, RTIOR = 1.5 and QRCSN = 15%

STORAGE - Storage-elevation values are based on usable storage. The storage in Cayuga Lake below sill elevation 371.5, is not included. Usable storage is determined assuming that the surface area will not significantly increase with changes in pool elevation above the sill.



SPILLWAY

Tainter Gate Structure - 6 gates @ 30 ft clearance

Assume that at the start of the storm, the tainter gates are fully open. Flow over spillway is that for a broad crested weir.
(Ref: Davis, "Handbook of Applied Hydraulics" - pg 1225)

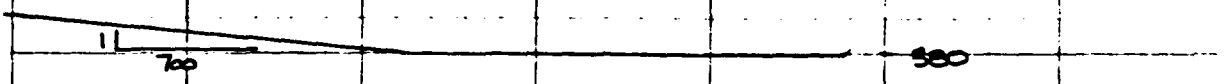
$$Q = 0.9\,CLH^{1.5}$$

$$= 0.9\,[3.09\,(6)(30)\,H^{1.5}] = 500\,H^{1.5}$$

Note: The top of the retaining wall is at EL 387.2. Though the top of the dam is given as 389.8, the dam will start to overtop at EL 387.2

DISCHARGE - DOWNSTREAM CHANNEL

The downstream channel is the Cayuga and Seneca Canal, which is laid on an extremely flat slope. Directly adjacent to the left side of the canal is the Montezuma Marsh, which is approximately 5 sq mi of open, flat land. When flood discharge overtops the canal, water will be attenuated in the marsh. Flow control will occur approximately 1 mi downstream, where RT 20 crosses the marsh.
The roadway will control flow as a broad-crested weir, where $Q = 2.7\,LH^{1.5}$

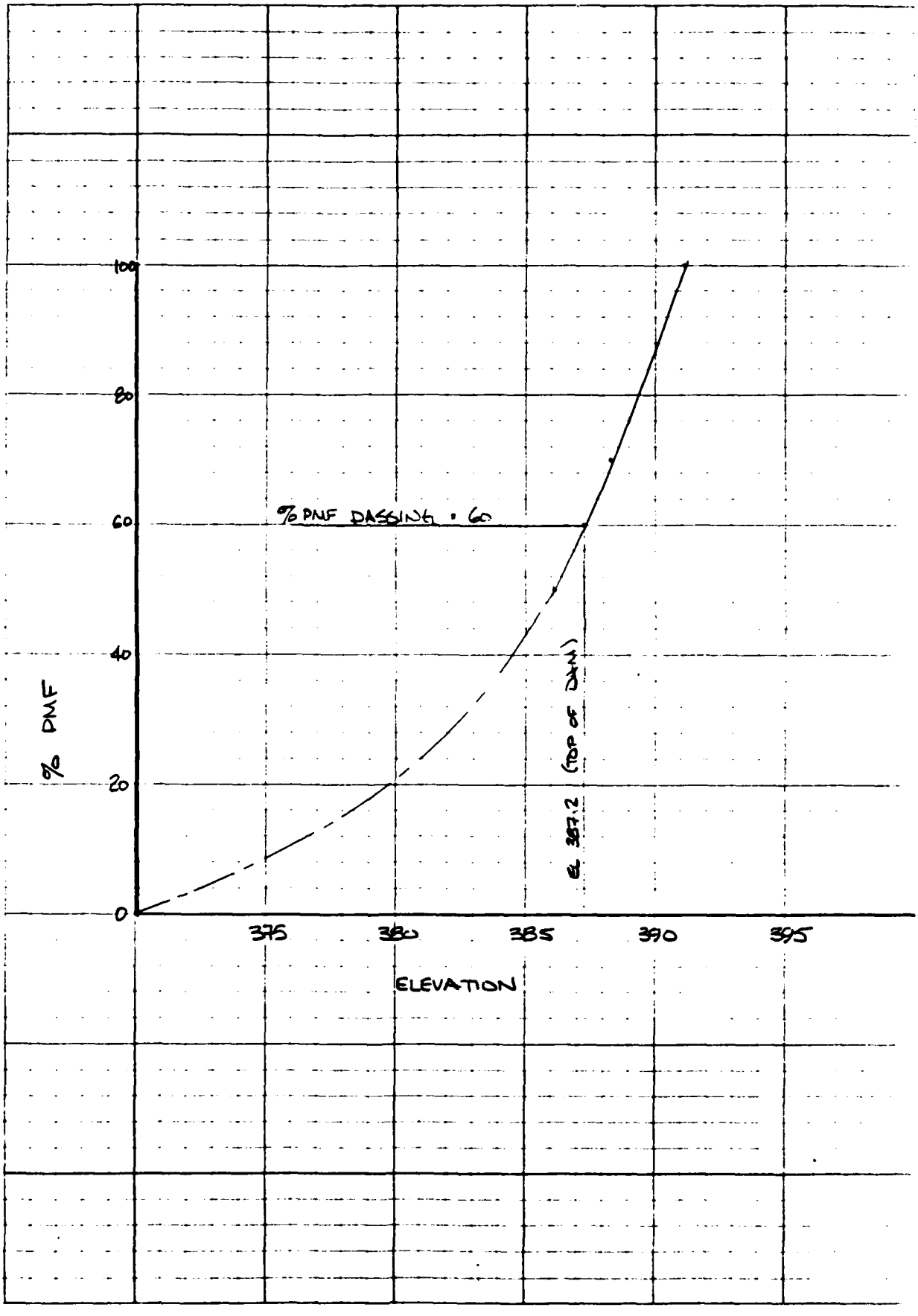


WSE	H	$\bar{H}$	L	$Q = 2.7\,LH^{1.5}$	$2.7(250)H^{1.5}$ =
382	2	1	1400	3780	1910	5690
383	3	1.5	2100	10420	3510	13930
384	4	2	2800	21380	5400	26780

Project NV C&E PH I DAM INSP Acct. No. 7594 Page ____ of ____

Subject MUD LOCK DAM Compld. By M. NOWAK Date 8/27/81

Detail ____ Ck'd. By ____ Date ____



```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  25 SEP 78
**********
    1  A                NEW YORK C.OF E. PHASE 1 DAM INSPECTION
    2  A                          MUD LOCK DAM
    3  A                    FULL AND HALF PMF FLOOD ANALYSIS
    4  B    100       2       0       0       0       0       0       0       0       0
    5  B1     5
    6  J      1       4       1
    7  J1   0.5     0.6     0.7     1.0
    8  K      0       1                       0       0       1       0
    9  K1                   AREA 1 RUNOFF DIRECT TO LAKE SURFACE
   10  M      1       1      66                       0       0                       1
   11  P      0      21      79      89      98     107
   12  T                                                       0       0               1
   13  W    1.0     1.0
   14  X      0       0     1.5
   15  K      0       2                       0       0       1       0
   16  K1                   AREA 2 RUNOFF FROM PRINCIPAL STREAMS
   17  M      1       1     303                       0       0                       1
   18  P      0      21      64      73      80      89
   19  T                                                     1.0     0.1               0
   20  W   12.6     0.6
   21  X     47    -.15     1.5
   22  K      0       3                       0       0       1       0
   23  K1                   AREA 3 RUNOFF FROM SHORTER STREAMS
   24  M      1       1     454                       0       0                       1
   25  P      0      21      60      69      76      84
   26  T                                                     1.0     0.1               0
   27  W    8.7     0.6
   28  X    1.3    -.15     1.5
   29  K      3     DAM                       0       0       1       0
   30  K1                   COMBINE SUBAREA HYDROGRAPHS AT DAM
   31  K      1     DAM                       0       0       1       0
   32  K1                   ROUTE INFLOW THROUGH CAYUGA LAKE
   33  Y                            1       1
   34  Y1    20                                           -383.0       1
   35  $S     0  486000  570760  655760  740760  825760  910760  995760 1080760 1165760
   36  $E 371.5   383.0   385.0   387.0   389.0   391.0   393.0   395.0   397.0   399.0
   37  $$ 371.5     180     3.1     1.5
   38  $R    10       0       0
   39  $F     6       0      12   371.5   300.0       0    11.5   383.0
   40  ST 371.5   373.0   375.0   377.0   380.0   383.0   384.0
   41  $W     0     920    3280    6450   12400   13930   26780
   42  $D 387.2     2.6     1.5  1000.0
   43  K     99
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
RUNOFF HYDROGRAPH AT	2
RUNOFF HYDROGRAPH AT	3
COMBINE 3 HYDROGRAPHS AT	DAM
ROUTE HYDROGRAPH TO	DAM
END OF NETWORK	

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  25 SEP 78
**********

RUN  DATE:26 AUG 1981
```

NEW YORK C.OF E. PHASE 1 DAM INSPECTION
MUD LOCK DAM
FULL AND HALF PMF FLOOD ANALYSIS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	2	0	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 4 LRTIO= 1
RTIOS= 0.50 0.60 0.70 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

AREA 1 RUNOFF DIRECT TO LAKE SURFACE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	66.00	0.0	66.00	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	21.00	79.00	89.00	98.00	107.00	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.857

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0	0.0	1.00

UNIT HYDROGRAPH DATA
TP= 1.00 CP=1.00 NTA= 0

RECESSION DATA
STRTQ= 0.0 QRCSN= 0.0 RTIOR= 1.50

TC INCREASED TO TRHR OF 2.00
CLARK DID NOT CONVERGE TO GIVEN SNYDER COEFFICIENTS
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 1.00 AND R= 0.50 INTERVALS

UNIT HYDROGRAPH 2 END-OF-PERIOD ORDINATES, LAG= 1.57 HOURS, CP= 0.50 VOL= 1.00
10643. 10643.

						END-OF-PERIOD FLOW						
O NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

1.01	2.00	1	0.02	0.02	0.0	211.	1.05	6.00	51	0.0	0.0	0.0	0.
1.01	4.00	2	0.02	0.02	0.0	422.	1.05	8.00	52	0.0	0.0	0.0	0.
1.01	6.00	3	0.02	0.02	0.0	422.	1.05	10.00	53	0.0	0.0	0.0	0.
1.01	8.00	4	0.06	0.06	0.0	797.	1.05	12.00	54	0.0	0.0	0.0	0.
1.01	10.00	5	0.06	0.06	0.0	1172.	1.05	14.00	55	0.0	0.0	0.0	0.
1.01	12.00	6	0.06	0.06	0.0	1172.	1.05	16.00	56	0.0	0.0	0.0	0.
1.01	14.00	7	0.34	0.34	0.0	4198.	1.05	18.00	57	0.0	0.0	0.0	0.
1.01	16.00	8	0.69	0.69	0.0	10975.	1.05	20.00	58	0.0	0.0	0.0	0.
1.01	18.00	9	0.27	0.27	0.0	10281.	1.05	22.00	59	0.0	0.0	0.0	0.
1.01	20.00	10	0.03	0.03	0.0	3234.	1.06	0.0	60	0.0	0.0	0.0	0.
1.01	22.00	11	0.03	0.03	0.0	633.	1.06	2.00	61	0.0	0.0	0.0	0.
1.02	0.0	12	0.03	0.03	0.0	633.	1.06	4.00	62	0.0	0.0	0.0	0.
1.02	2.00	13	0.22	0.22	0.0	2614.	1.06	6.00	63	0.0	0.0	0.0	0.
1.02	4.00	14	0.22	0.22	0.0	4596.	1.06	8.00	64	0.0	0.0	0.0	0.
1.02	6.00	15	0.22	0.22	0.0	4596.	1.06	10.00	65	0.0	0.0	0.0	0.
1.02	8.00	16	0.60	0.60	0.0	8681.	1.06	12.00	66	0.0	0.0	0.0	0.
1.02	10.00	17	0.60	0.60	0.0	12766.	1.06	14.00	67	0.0	0.0	0.0	0.
1.02	12.00	18	0.60	0.60	0.0	12766.	1.06	16.00	68	0.0	0.0	0.0	0.
1.02	14.00	19	3.70	3.70	0.0	45716.	1.06	18.00	69	0.0	0.0	0.0	0.
1.02	16.00	20	7.53	7.53	0.0	119510.	1.06	20.00	70	0.0	0.0	0.0	0.
1.02	18.00	21	2.99	2.99	0.0	111946.	1.06	22.00	71	0.0	0.0	0.0	0.
1.02	20.00	22	0.32	0.32	0.0	35215.	1.07	0.0	72	0.0	0.0	0.0	0.
1.02	22.00	23	0.32	0.32	0.0	6894.	1.07	2.00	73	0.0	0.0	0.0	0.
1.03	0.0	24	0.32	0.32	0.0	6894.	1.07	4.00	74	0.0	0.0	0.0	0.
1.03	2.00	25	0.0	0.0	0.0	3447.	1.07	6.00	75	0.0	0.0	0.0	0.
1.03	4.00	26	0.0	0.0	0.0	0.	1.07	8.00	76	0.0	0.0	0.0	0.
1.03	6.00	27	0.0	0.0	0.0	0.	1.07	10.00	77	0.0	0.0	0.0	0.
1.03	8.00	28	0.0	0.0	0.0	0.	1.07	12.00	78	0.0	0.0	0.0	0.
1.03	10.00	29	0.0	0.0	0.0	0.	1.07	14.00	79	0.0	0.0	0.0	0.
1.03	12.00	30	0.0	0.0	0.0	0.	1.07	16.00	80	0.0	0.0	0.0	0.
1.03	14.00	31	0.0	0.0	0.0	0.	1.07	18.00	81	0.0	0.0	0.0	0.
1.03	16.00	32	0.0	0.0	0.0	0.	1.07	20.00	82	0.0	0.0	0.0	0.
1.03	18.00	33	0.0	0.0	0.0	0.	1.07	22.00	83	0.0	0.0	0.0	0.
1.03	20.00	34	0.0	0.0	0.0	0.	1.08	0.0	84	0.0	0.0	0.0	0.
1.03	22.00	35	0.0	0.0	0.0	0.	1.08	2.00	85	0.0	0.0	0.0	0.
1.04	0.0	36	0.0	0.0	0.0	0.	1.08	4.00	86	0.0	0.0	0.0	0.
1.04	2.00	37	0.0	0.0	0.0	0.	1.08	6.00	87	0.0	0.0	0.0	0.
1.04	4.00	38	0.0	0.0	0.0	0.	1.08	8.00	88	0.0	0.0	0.0	0.
1.04	6.00	39	0.0	0.0	0.0	0.	1.08	10.00	89	0.0	0.0	0.0	0.
1.04	8.00	40	0.0	0.0	0.0	0.	1.08	12.00	90	0.0	0.0	0.0	0.
1.04	10.00	41	0.0	0.0	0.0	0.	1.08	14.00	91	0.0	0.0	0.0	0.
1.04	12.00	42	0.0	0.0	0.0	0.	1.08	16.00	92	0.0	0.0	0.0	0.
1.04	14.00	43	0.0	0.0	0.0	0.	1.08	18.00	93	0.0	0.0	0.0	0.
1.04	16.00	44	0.0	0.0	0.0	0.	1.08	20.00	94	0.0	0.0	0.0	0.
1.04	18.00	45	0.0	0.0	0.0	0.	1.08	22.00	95	0.0	0.0	0.0	0.
1.04	20.00	46	0.0	0.0	0.0	0.	1.09	0.0	96	0.0	0.0	0.0	0.
1.04	22.00	47	0.0	0.0	0.0	0.	1.09	2.00	97	0.0	0.0	0.0	0.
1.05	0.0	48	0.0	0.0	0.0	0.	1.09	4.00	98	0.0	0.0	0.0	0.
1.05	2.00	49	0.0	0.0	0.0	0.	1.09	6.00	99	0.0	0.0	0.0	0.
1.05	4.00	50	0.0	0.0	0.0	0.	1.09	8.00	100	0.0	0.0	0.0	0.
									SUM	19.25	19.25	0.0	409791.
										(489.)	(489.)	(0.)	(11604.01)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	119510.	90641.	31051.	11380.	409688.
CMS	3384.	2567.	879.	322.	11601.
INCHES		12.78	17.51	19.25	19.25
MM		324.49	444.65	488.89	488.89

AC-FT	44946.	61589.	67717.	67717.
THOUS CU M	55440.	75968.	83528.	83528.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

106.	211.	211.	399.	586.	586.	2099.	5488.	5140.	1617.
317.	317.	1307.	2298.	2298.	4340.	6383.	6383.	22858.	59755.
55973.	17608.	3447.	3447.	1723.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	59755.	45320.	15525.	5690.	204844.
CMS	1692.	1283.	440.	161.	5801.
INCHES		6.39	8.75	9.62	9.62
MM		162.25	222.32	244.45	244.45
AC-FT		22473.	30794.	33858.	33858.
THOUS CU M		27720.	37984.	41764.	41764.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

127.	253.	253.	478.	703.	703.	2519.	6585.	6168.	1940.
380.	380.	1569.	2757.	2757.	5209.	7660.	7660.	27429.	71706.
67168.	21129.	4136.	4136.	2068.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	71706.	54394.	18631.	6828.	245813.
CMS	2030.	1540.	528.	193.	6961.
INCHES		7.67	10.50	11.55	11.55
MM		194.70	266.79	293.34	293.34
AC-FT		26967.	36953.	40630.	40630.
THOUS CU M		33264.	45581.	50117.	50117.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

148.	295.	295.	558.	821.	821.	2939.	7683.	7197.	2264.
443.	443.	1830.	3217.	3217.	6077.	8936.	8936.	32001.	83657.
78362.	24651.	4826.	4826.	2413.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	83657.	63449.	21736.	7966.	286781.

CMS	2369.	1797.	615.	226.	8121.
INCHES		8.94	12.25	13.47	13.47
MM		227.14	311.25	342.22	342.22

AC-FT	31452.	43112.	47402.	47402.
THOUS CU M	38808.	53178.	58469.	58469.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

211.	422.	422.	797.	1172.	1172.	4198.	10975.	10261.	3234.
633.	633.	2614.	4596.	4596.	8681.	12766.	12766.	45716.	119510.
111946.	35215.	6894.	6894.	3447.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	119510.	90641.	31051.	11380.	409688.
CMS	3384.	2567.	879.	322.	11601.
INCHES		12.78	17.51	19.25	19.25
MM		324.49	444.65	488.89	488.89
AC-FT		44946.	61589.	67717.	67717.
THOUS CU M		55440.	75968.	83528.	83528.

****

SUB-AREA RUNOFF COMPUTATION

AREA 2 RUNOFF FROM PRINCIPAL STREAMS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	303.00	0.0	303.00	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PRS	R6	R12	R24	R48	R72	R96
0.0	21.00	64.00	73.00	80.00	89.00	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.891

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.10	0.0	0.0

UNIT HYDROGRAPH DATA

TP= 12.60 CP=0.60 NTA= 0

RECESSION DATA

STRTQ= 47.00 QRCSN= -0.15 RTIOR= 1.50

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 7.19 AND R= 6.11 INTERVALS

UNIT HYDROGRAPH 37 END-OF-PERIOD ORDINATES, LAG= 12.51 HOURS, CP= 0.61 VOL= 1.00

542.	1994.	3967.	6136.	8025.	9197.	9519.	8784.	7500.	6365.

5402.	4584.	3890.	3301.	2802.	2378.	2018.	1712.	1453.	1233.
1047.	888.	754.	640.	543.	461.	391.	332.	282.	239.
203.	172.	146.	124.	105.	89.	76.			

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	2.00	1	0.02	0.00	0.02	45.	1.05	6.00	51	0.0	0.0	0.0	10223.
1.01	4.00	2	0.02	0.00	0.02	43.	1.05	8.00	52	0.0	0.0	0.0	9817.
1.01	6.00	3	0.02	0.00	0.02	42.	1.05	10.00	53	0.0	0.0	0.0	9427.
1.01	8.00	4	0.06	0.00	0.06	40.	1.05	12.00	54	0.0	0.0	0.0	9053.
1.01	10.00	5	0.06	0.00	0.06	38.	1.05	14.00	55	0.0	0.0	0.0	8693.
1.01	12.00	6	0.06	0.00	0.06	37.	1.05	16.00	56	0.0	0.0	0.0	8347.
1.01	14.00	7	0.35	0.00	0.35	35.	1.05	18.00	57	0.0	0.0	0.0	8016.
1.01	16.00	8	0.71	0.22	0.49	156.	1.05	20.00	58	0.0	0.0	0.0	7697.
1.01	18.00	9	0.28	0.08	0.20	526.	1.05	22.00	59	0.0	0.0	0.0	7391.
1.01	20.00	10	0.03	0.00	0.03	1088.	1.06	0.0	60	0.0	0.0	0.0	7098.
1.01	22.00	11	0.03	0.00	0.03	1738.	1.06	2.00	61	0.0	0.0	0.0	6816.
1.02	0.0	12	0.03	0.00	0.03	2341.	1.06	4.00	62	0.0	0.0	0.0	6545.
1.02	2.00	13	0.17	0.00	0.17	2759.	1.06	6.00	63	0.0	0.0	0.0	6285.
1.02	4.00	14	0.17	0.00	0.17	2928.	1.06	8.00	64	0.0	0.0	0.0	6035.
1.02	6.00	15	0.17	0.00	0.17	2788.	1.06	10.00	65	0.0	0.0	0.0	5795.
1.02	8.00	16	0.56	0.36	0.20	2633.	1.06	12.00	66	0.0	0.0	0.0	5565.
1.02	10.00	17	0.56	0.36	0.20	2991.	1.06	14.00	67	0.0	0.0	0.0	5344.
1.02	12.00	18	0.56	0.36	0.20	4112.	1.06	16.00	68	0.0	0.0	0.0	5131.
1.02	14.00	19	3.11	2.91	0.20	7447.	1.06	18.00	69	0.0	0.0	0.0	4928.
1.02	16.00	20	6.34	6.14	0.20	16961.	1.06	20.00	70	0.0	0.0	0.0	4732.
1.02	18.00	21	2.51	2.31	0.20	34581.	1.06	22.00	71	0.0	0.0	0.0	4544.
1.02	20.00	22	0.26	0.06	0.20	57477.	1.07	0.0	72	0.0	0.0	0.0	4363.
1.02	22.00	23	0.26	0.06	0.20	81132.	1.07	2.00	73	0.0	0.0	0.0	4190.
1.03	0.0	24	0.26	0.06	0.20	100687.	1.07	4.00	74	0.0	0.0	0.0	4023.
1.03	2.00	25	0.0	0.0	0.0	112306.	1.07	6.00	75	0.0	0.0	0.0	3863.
1.03	4.00	26	0.0	0.0	0.0	113923.	1.07	8.00	76	0.0	0.0	0.0	3710.
1.03	6.00	27	0.0	0.0	0.0	105610.	1.07	10.00	77	0.0	0.0	0.0	3563.
1.03	8.00	28	0.0	0.0	0.0	91968.	1.07	12.00	78	0.0	0.0	0.0	3421.
1.03	10.00	29	0.0	0.0	0.0	78452.	1.07	14.00	79	0.0	0.0	0.0	3285.
1.03	12.00	30	0.0	0.0	0.0	66731.	1.07	16.00	80	0.0	0.0	0.0	3155.
1.03	14.00	31	0.0	0.0	0.0	56679.	1.07	18.00	81	0.0	0.0	0.0	3029.
1.03	16.00	32	0.0	0.0	0.0	48104.	1.07	20.00	82	0.0	0.0	0.0	2909.
1.03	18.00	33	0.0	0.0	0.0	40825.	1.07	22.00	83	0.0	0.0	0.0	2793.
1.03	20.00	34	0.0	0.0	0.0	34647.	1.08	0.0	84	0.0	0.0	0.0	2682.
1.03	22.00	35	0.0	0.0	0.0	29404.	1.08	2.00	85	0.0	0.0	0.0	2576.
1.04	0.0	36	0.0	0.0	0.0	24954.	1.08	4.00	86	0.0	0.0	0.0	2473.
1.04	2.00	37	0.0	0.0	0.0	21178.	1.08	6.00	87	0.0	0.0	0.0	2375.
1.04	4.00	38	0.0	0.0	0.0	17974.	1.08	8.00	88	0.0	0.0	0.0	2281.
1.04	6.00	39	0.0	0.0	0.0	16631.	1.08	10.00	89	0.0	0.0	0.0	2190.
1.04	8.00	40	0.0	0.0	0.0	15970.	1.08	12.00	90	0.0	0.0	0.0	2103.
1.04	10.00	41	0.0	0.0	0.0	15335.	1.08	14.00	91	0.0	0.0	0.0	2019.
1.04	12.00	42	0.0	0.0	0.0	14726.	1.08	16.00	92	0.0	0.0	0.0	1939.
1.04	14.00	43	0.0	0.0	0.0	14141.	1.08	18.00	93	0.0	0.0	0.0	1862.
1.04	16.00	44	0.0	0.0	0.0	13579.	1.08	20.00	94	0.0	0.0	0.0	1788.
1.04	18.00	45	0.0	0.0	0.0	13039.	1.08	22.00	95	0.0	0.0	0.0	1717.
1.04	20.00	46	0.0	0.0	0.0	12521.	1.09	0.0	96	0.0	0.0	0.0	1649.
1.04	22.00	47	0.0	0.0	0.0	12024.	1.09	2.00	97	0.0	0.0	0.0	1583.
1.05	0.0	48	0.0	0.0	0.0	11546.	1.09	4.00	98	0.0	0.0	0.0	1520.
1.05	2.00	49	0.0	0.0	0.0	11087.	1.09	6.00	99	0.0	0.0	0.0	1460.
1.05	4.00	50	0.0	0.0	0.0	10646.	1.09	8.00	100	0.0	0.0	0.0	1402.
									SUM	16.65	12.95	3.70	1550030.
										(423.)	(329.)	(94.)	(43892.03)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	113923.	109792.	79231.	37262.	1549307.

CMS	3226.	3109.	2244.	1055.	43872.
INCHES		3.37	9.73	13.73	15.85
MM		85.62	247.14	348.68	402.72

AC-FT	54443.	157152.	221724.	256084.
THOUS CU M	67154.	193845.	273492.	315875.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 1

23.	22.	21.	20.	19.	18.	18.	78.	263.	544.
869.	1170.	1380.	1464.	1394.	1317.	1496.	2056.	3724.	8480.
17291.	28738.	40566.	50348.	56153.	56961.	52805.	45984.	39226.	33366.
28339.	24052.	20412.	17323.	14702.	12477.	10589.	8987.	8315.	7985.
7668.	7363.	7070.	6789.	6520.	6261.	6012.	5773.	5544.	5323.
5112.	4909.	4714.	4526.	4346.	4174.	4008.	3849.	3696.	3549.
3408.	3272.	3142.	3018.	2898.	2782.	2672.	2566.	2464.	2366.
2272.	2182.	2095.	2012.	1932.	1855.	1781.	1710.	1643.	1577.
1515.	1454.	1397.	1341.	1288.	1237.	1188.	1140.	1095.	1052.
1010.	970.	931.	894.	859.	824.	792.	760.	730.	701.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	56961.	54836.	39616.	18631.	774654.
CMS	1613.	1554.	1122.	528.	21936.
INCHES		1.69	4.86	6.86	7.93
MM		42.81	123.57	174.34	201.36
AC-FT		27221.	78576.	110862.	128042.
THOUS CU M		33577.	96922.	136746.	157938.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 2

27.	26.	25.	24.	23.	22.	21.	94.	315.	653.
1043.	1404.	1656.	1757.	1673.	1580.	1795.	2467.	4468.	10177.
20749.	34486.	48679.	60412.	67384.	68354.	63366.	55181.	47071.	40039.
34007.	28863.	24495.	20788.	17642.	14973.	12707.	10784.	9978.	9582.
9201.	8835.	8484.	8147.	7824.	7513.	7214.	6927.	6652.	6388.
6134.	5890.	5656.	5432.	5216.	5008.	4809.	4618.	4435.	4259.
4089.	3927.	3771.	3621.	3477.	3339.	3206.	3079.	2957.	2839.
2726.	2618.	2514.	2414.	2318.	2226.	2138.	2053.	1971.	1893.
1817.	1745.	1676.	1609.	1545.	1484.	1425.	1368.	1314.	1262.
1212.	1164.	1117.	1073.	1030.	989.	950.	912.	876.	841.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	68354.	65875.	47539.	22357.	929584.
CMS	1936.	1855.	1346.	633.	26323.
INCHES		2.02	5.84	8.24	9.51
MM		51.37	148.28	209.21	241.63
AC-FT		32666.	94291.	133034.	153650.
THOUS CU M		40292.	116307.	164095.	189525.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 3

32.	30.	29.	28.	27.	26.	25.	109.	368.	762.
1216.	1638.	1932.	2049.	1952.	1843.	2094.	2879.	5213.	11873.
24207.	40234.	56792.	70481.	78614.	79746.	73927.	64377.	54916.	46712.
39675.	33673.	28577.	24253.	20583.	17468.	14825.	12582.	11641.	11179.
10735.	10308.	9898.	9505.	9127.	8765.	8416.	8082.	7761.	7453.
7156.	6872.	6599.	6337.	6085.	5843.	5611.	5388.	5174.	4968.
4771.	4581.	4399.	4225.	4057.	3895.	3741.	3592.	3449.	3312.
3181.	3054.	2933.	2815.	2704.	2597.	2494.	2395.	2300.	2208.
2120.	2036.	1955.	1878.	1803.	1731.	1663.	1596.	1533.	1472.
1414.	1357.	1304.	1252.	1202.	1154.	1108.	1064.	1022.	981.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	79746.	76855.	55462.	26083.	1084515.

CMS	2258.	2176.	1571.	739.	30710.
INCHES		2.36	6.81	9.61	11.10
MM		59.93	173.00	244.08	281.90
AC-FT		38110.	110007.	155206.	179259.
THOUS CU M		47008.	135691.	191445.	221113.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 4

45.	43.	42.	40.	38.	37.	35.	156.	526.	1088.
1738.	2341.	2759.	2928.	2788.	2633.	2991.	4112.	7447.	16961.
34581.	57477.	81132.	100687.	112306.	113923.	105610.	91968.	78452.	66731.
56679.	48104.	40825.	34647.	29404.	24954.	21178.	17974.	16631.	15970.
15335.	14726.	14141.	13579.	13039.	12521.	12024.	11546.	11087.	10646.
10223.	9817.	9427.	9053.	8693.	8347.	8016.	7697.	7391.	7098.
6816.	6545.	6285.	6035.	5795.	5565.	5344.	5131.	4928.	4732.
4544.	4363.	4190.	4023.	3863.	3710.	3563.	3421.	3285.	3155.
3029.	2909.	2793.	2682.	2576.	2473.	2375.	2281.	2190.	2103.
2019.	1939.	1862.	1788.	1717.	1649.	1583.	1520.	1460.	1402.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	113923.	109792.	79231.	37262.	1549307.
CMS	3226.	3109.	2244.	1055.	43872.
INCHES		3.37	9.73	13.73	15.85
MM		85.62	247.14	348.68	402.72
AC-FT		54443.	157152.	221724.	256084.
THOUS CU M		67154.	193845.	273492.	315875.

****

SUB-AREA RUNOFF COMPUTATION

AREA 3 RUNOFF FROM SHORTER STREAMS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	454.00	0.0	454.00	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	21.00	60.00	69.00	76.00	84.00	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.898

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.10	0.0	0.0

UNIT HYDROGRAPH DATA

TP= 8.70 CP=0.60 NTA= 0

RECESSION DATA

STRTQ= 1.30 QRCSN= -0.15 RTIOR= 1.50

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.04 AND R= 4.32 INTERVALS

UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG= 8.72 HOURS, CP= 0.60 VOL= 1.00

1894.	6860.	13182.	18245.	19981.	17860.	14175.	11237.	8908.	7062.

5598. 4438. 3518. 2789. 2211. 1753. 1389. 1101. 873. 692.
549. 435. 345. 273. 217. 172.

END-OF-PERIOD FLOW

O NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	2.00	1	0.02	0.00	0.02	1.	1.05	6.00	51	0.0	0.0	0.0	15799.
1.01	4.00	2	0.02	0.00	0.02	1.	1.05	8.00	52	0.0	0.0	0.0	15172.
1.01	6.00	3	0.02	0.00	0.02	1.	1.05	10.00	53	0.0	0.0	0.0	14569.
1.01	8.00	4	0.06	0.00	0.06	1.	1.05	12.00	54	0.0	0.0	0.0	13990.
1.01	10.00	5	0.06	0.00	0.06	1.	1.05	14.00	55	0.0	0.0	0.0	13434.
1.01	12.00	6	0.06	0.00	0.06	1.	1.05	16.00	56	0.0	0.0	0.0	12900.
1.01	14.00	7	0.31	0.00	0.31	1.	1.05	18.00	57	0.0	0.0	0.0	12388.
1.01	16.00	8	0.63	0.12	0.51	228.	1.05	20.00	58	0.0	0.0	0.0	11895.
1.01	18.00	9	0.25	0.05	0.20	919.	1.05	22.00	59	0.0	0.0	0.0	11423.
1.01	20.00	10	0.03	0.00	0.03	1926.	1.06	0.0	60	0.0	0.0	0.0	10969.
1.01	22.00	11	0.03	0.00	0.03	2850.	1.06	2.00	61	0.0	0.0	0.0	10533.
1.02	0.0	12	0.03	0.00	0.03	3312.	1.06	4.00	62	0.0	0.0	0.0	10114.
1.02	2.00	13	0.18	0.00	0.18	3145.	1.06	6.00	63	0.0	0.0	0.0	9713.
1.02	4.00	14	0.18	0.00	0.18	2597.	1.06	8.00	64	0.0	0.0	0.0	9327.
1.02	6.00	15	0.18	0.00	0.18	2060.	1.06	10.00	65	0.0	0.0	0.0	8956.
1.02	8.00	16	0.57	0.37	0.20	2326.	1.06	12.00	66	0.0	0.0	0.0	8600.
1.02	10.00	17	0.57	0.37	0.20	4498.	1.06	14.00	67	0.0	0.0	0.0	8258.
1.02	12.00	18	0.57	0.37	0.20	9053.	1.06	16.00	68	0.0	0.0	0.0	7930.
1.02	14.00	19	2.94	2.74	0.20	20019.	1.06	18.00	69	0.0	0.0	0.0	7615.
1.02	16.00	20	6.00	5.80	0.20	49255.	1.06	20.00	70	0.0	0.0	0.0	7313.
1.02	18.00	21	2.38	2.18	0.20	101090.	1.06	22.00	71	0.0	0.0	0.0	7022.
1.02	20.00	22	0.26	0.06	0.20	160972.	1.07	0.0	72	0.0	0.0	0.0	6743.
1.02	22.00	23	0.26	0.06	0.20	206010.	1.07	2.00	73	0.0	0.0	0.0	6475.
1.03	0.0	24	0.26	0.06	0.20	218782.	1.07	4.00	74	0.0	0.0	0.0	6218.
1.03	2.00	25	0.0	0.0	0.0	198546.	1.07	6.00	75	0.0	0.0	0.0	5971.
1.03	4.00	26	0.0	0.0	0.0	163241.	1.07	8.00	76	0.0	0.0	0.0	5733.
1.03	6.00	27	0.0	0.0	0.0	130427.	1.07	10.00	77	0.0	0.0	0.0	5506.
1.03	8.00	28	0.0	0.0	0.0	103878.	1.07	12.00	78	0.0	0.0	0.0	5287.
1.03	10.00	29	0.0	0.0	0.0	82478.	1.07	14.00	79	0.0	0.0	0.0	5077.
1.03	12.00	30	0.0	0.0	0.0	65385.	1.07	16.00	80	0.0	0.0	0.0	4875.
1.03	14.00	31	0.0	0.0	0.0	51833.	1.07	18.00	81	0.0	0.0	0.0	4681.
1.03	16.00	32	0.0	0.0	0.0	41090.	1.07	20.00	82	0.0	0.0	0.0	4495.
1.03	18.00	33	0.0	0.0	0.0	32780.	1.07	22.00	83	0.0	0.0	0.0	4317.
1.03	20.00	34	0.0	0.0	0.0	31477.	1.08	0.0	84	0.0	0.0	0.0	4145.
1.03	22.00	35	0.0	0.0	0.0	30227.	1.08	2.00	85	0.0	0.0	0.0	3980.
1.04	0.0	36	0.0	0.0	0.0	29025.	1.08	4.00	86	0.0	0.0	0.0	3822.
1.04	2.00	37	0.0	0.0	0.0	27872.	1.08	6.00	87	0.0	0.0	0.0	3670.
1.04	4.00	38	0.0	0.0	0.0	26765.	1.08	8.00	88	0.0	0.0	0.0	3525.
1.04	6.00	39	0.0	0.0	0.0	25701.	1.08	10.00	89	0.0	0.0	0.0	3385.
1.04	8.00	40	0.0	0.0	0.0	24680.	1.08	12.00	90	0.0	0.0	0.0	3250.
1.04	10.00	41	0.0	0.0	0.0	23699.	1.08	14.00	91	0.0	0.0	0.0	3121.
1.04	12.00	42	0.0	0.0	0.0	22758.	1.08	16.00	92	0.0	0.0	0.0	2997.
1.04	14.00	43	0.0	0.0	0.0	21853.	1.08	18.00	93	0.0	0.0	0.0	2878.
1.04	16.00	44	0.0	0.0	0.0	20985.	1.08	20.00	94	0.0	0.0	0.0	2763.
1.04	18.00	45	0.0	0.0	0.0	20151.	1.08	22.00	95	0.0	0.0	0.0	2654.
1.04	20.00	46	0.0	0.0	0.0	19350.	1.09	0.0	96	0.0	0.0	0.0	2548.
1.04	22.00	47	0.0	0.0	0.0	18581.	1.09	2.00	97	0.0	0.0	0.0	2447.
1.05	0.0	48	0.0	0.0	0.0	17843.	1.09	4.00	98	0.0	0.0	0.0	2350.
1.05	2.00	49	0.0	0.0	0.0	17134.	1.09	6.00	99	0.0	0.0	0.0	2256.
1.05	4.00	50	0.0	0.0	0.0	16453.	1.09	8.00	100	0.0	0.0	0.0	2167.
									SUM	15.85	12.18	3.67	2398517.
										(402.)(309.)(93.)(67918.55)			

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	218782.	201517.	127318.	57706.	2397433.
CMS	6195.	5706.	3605.	1634.	67888.

INCHES	4.13	10.43	14.19	16.37
MM	104.88	265.04	360.39	415.91
AC-FT	99926.	252531.	343372.	396270.
THOUS CU M	123257.	311493.	423544.	488792.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 1

1.	1.	1.	1.	1.	1.	0.	114.	459.	963.
1425.	1656.	1573.	1298.	1030.	1163.	2249.	4526.	10009.	24628.
50545.	80486.	103005.	109391.	99273.	81621.	65214.	51939.	41239.	32692.
25916.	20545.	16390.	15739.	15113.	14513.	13936.	13382.	12851.	12340.
11850.	11379.	10927.	10492.	10076.	9675.	9291.	8922.	8567.	8227.
7900.	7586.	7284.	6995.	6717.	6450.	6194.	5948.	5711.	5484.
5266.	5057.	4856.	4663.	4478.	4300.	4129.	3965.	3808.	3656.
3511.	3371.	3238.	3109.	2985.	2867.	2753.	2643.	2538.	2438.
2341.	2248.	2158.	2073.	1990.	1911.	1835.	1762.	1692.	1625.
1560.	1498.	1439.	1382.	1327.	1274.	1223.	1175.	1128.	1083.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	109391.	100758.	63659.	28853.	1198717.
CMS	3098.	2853.	1803.	817.	33944.
INCHES		2.06	5.22	7.09	8.19
MM		52.44	132.52	180.19	207.95
AC-FT		49963.	126266.	171686.	198135.
THOUS CU M		61628.	155747.	211772.	244396.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 2

1.	1.	1.	1.	1.	1.	1.	137.	551.	1155.
1710.	1987.	1887.	1558.	1236.	1396.	2699.	5432.	12011.	29553.
60654.	96583.	123606.	131269.	119128.	97945.	78256.	62327.	49487.	39231.
31100.	24654.	19668.	18886.	18136.	17415.	16723.	16059.	15421.	14808.
14220.	13655.	13112.	12591.	12091.	11610.	11149.	10706.	10280.	9872.
9480.	9103.	8741.	8394.	8060.	7740.	7433.	7137.	6854.	6581.
6320.	6069.	5828.	5596.	5374.	5160.	4955.	4758.	4569.	4388.
4213.	4046.	3885.	3731.	3582.	3440.	3303.	3172.	3046.	2925.
2809.	2697.	2590.	2487.	2388.	2293.	2202.	2115.	2031.	1950.
1873.	1798.	1727.	1658.	1592.	1529.	1468.	1410.	1354.	1300.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	131269.	120910.	76391.	34623.	1438460.
CMS	3717.	3424.	2163.	980.	40733.
INCHES		2.48	6.26	8.51	9.82
MM		62.93	159.03	216.23	249.54
AC-FT		59955.	151519.	206023.	237762.
THOUS CU M		73954.	186896.	254126.	293275.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 3

1.	1.	1.	1.	1.	1.	1.	160.	643.	1348.
1995.	2319.	2202.	1818.	1442.	1628.	3148.	6337.	14013.	34479.
70763.	112681.	144207.	153147.	138982.	114269.	91299.	72715.	57735.	45769.
36283.	28763.	22946.	22034.	21159.	20318.	19511.	18735.	17991.	17276.
16589.	15930.	15297.	14689.	14106.	13545.	13007.	12490.	11994.	11517.
11060.	10620.	10198.	9793.	9404.	9030.	8671.	8327.	7996.	7678.
7373.	7080.	6799.	6529.	6269.	6020.	5781.	5551.	5331.	5119.
4915.	4720.	4533.	4352.	4179.	4013.	3854.	3701.	3554.	3413.

3277.	3147.	3022.	2902.	2786.	2676.	2569.	2467.	2369.	2275.
2185.	2098.	2014.	1934.	1858.	1784.	1713.	1645.	1579.	1517.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	153147.	141052.	89123.	40394.	1678203.
CMS	4337.	3994.	2524.	1144.	47522.
INCHES		2.89	7.30	9.93	11.46
MM		73.41	185.53	252.27	291.13
AC-FT		69948.	176772.	240361.	277389.
THOUS CU M		86280.	218045.	296481.	342155.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 4

1.	1.	1.	1.	1.	1.	1.	228.	919.	1926.
2850.	3312.	3145.	2597.	2060.	2326.	4498.	9053.	20019.	49255.
101090.	160972.	206010.	218782.	198546.	163241.	130427.	103878.	82478.	65385.
51833.	41090.	32780.	31477.	30227.	29025.	27872.	26765.	25701.	24680.
23699.	22758.	21853.	20985.	20151.	19350.	18581.	17843.	17134.	16453.
15799.	15172.	14569.	13990.	13434.	12900.	12388.	11895.	11423.	10969.
10533.	10114.	9713.	9327.	8956.	8600.	8258.	7930.	7615.	7313.
7022.	6743.	6475.	6218.	5971.	5733.	5506.	5287.	5077.	4875.
4681.	4495.	4317.	4145.	3980.	3822.	3670.	3525.	3385.	3250.
3121.	2997.	2878.	2763.	2654.	2548.	2447.	2350.	2256.	2167.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	218782.	201517.	127318.	57706.	2397433.
CMS	6195.	5706.	3605.	1634.	67888.
INCHES		4.13	10.43	14.19	16.37
MM		104.88	265.04	360.39	415.91
AC-FT		99926.	252531.	343372.	396270.
THOUS CU M		123257.	311493.	423544.	488792.

********** *********** ********** *********** **********

COMBINE HYDROGRAPHS

COMBINE SUBAREA HYDROGRAPHS AT DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	3	0	0	0	0	1	0	0

SUM OF 3 HYDROGRAPHS AT DAM PLAN 1 RTIO 1

129.	233.	232.	419.	606.	605.	2117.	5680.	5862.	3124.
2610.	3143.	4259.	5060.	4722.	6820.	10127.	12966.	36591.	92863.
123809.	126832.	147018.	163181.	157149.	138582.	118019.	97923.	80465.	66058.
54256.	44597.	36802.	33062.	29815.	26990.	24525.	22369.	21166.	20325.
19517.	18742.	17997.	17282.	16595.	15936.	15302.	14694.	14111.	13550.
13011.	12494.	11998.	11521.	11063.	10624.	10202.	9796.	9407.	9033.
8674.	8330.	7999.	7681.	7376.	7083.	6801.	6531.	6271.	6022.
5783.	5553.	5332.	5121.	4917.	4722.	4534.	4354.	4181.	4015.
3855.	3702.	3555.	3414.	3278.	3148.	3023.	2903.	2787.	2677.
2570.	2468.	2370.	2276.	2185.	2099.	2015.	1935.	1858.	1784.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	163181.	154377.	113110.	52108.	2178214.
CMS	4621.	4371.	3203.	1476.	61680.
INCHES		1.74	5.11	7.07	8.21

MM	44.32	129.89	179.52	208.45
AC-FT	76551.	224351.	310061.	360035.
THOUS CU M	94424.	276733.	382456.	444098.

SUM OF 3 HYDROGRAPHS AT DAM PLAN 1 RTIO 2

154.	280.	279.	503.	727.	726.	2541.	6816.	7035.	3749.
3133.	3772.	5111.	6072.	5666.	8184.	12153.	15559.	43909.	111436.
148571.	152199.	176421.	195818.	188579.	166298.	141622.	117508.	96558.	79270.
65107.	53516.	44163.	39674.	35778.	32388.	29430.	26843.	25399.	24390.
23421.	22490.	21596.	20738.	19914.	19123.	18363.	17633.	16933.	16260.
15614.	14993.	14398.	13825.	13276.	12749.	12242.	11756.	11288.	10840.
10409.	9996.	9598.	9217.	8851.	8499.	8161.	7837.	7526.	7227.
6939.	6664.	6399.	6145.	5900.	5666.	5441.	5225.	5017.	4818.
4626.	4442.	4266.	4096.	3934.	3777.	3627.	3483.	3345.	3212.
3084.	2962.	2844.	2731.	2622.	2518.	2418.	2322.	2230.	2141.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	195818.	185252.	135732.	62529.	2613857.
CMS	5545.	5246.	3844.	1771.	74016.
INCHES		2.09	6.14	8.48	9.85
MM		53.18	155.87	215.42	250.14
AC-FT		91851.	269221.	372078.	432042.
THOUS CU M		113309.	332080.	458947.	532917.

SUM OF 3 HYDROGRAPHS AT DAM PLAN 1 RTIO 3

180.	327.	325.	587.	848.	847.	2964.	7952.	8207.	4374.
3655.	4400.	5963.	7084.	6610.	9548.	14178.	18152.	51227.	130009.
173332.	177565.	205825.	228454.	220009.	194015.	165226.	137092.	112651.	92481.
75958.	62436.	51523.	46287.	41741.	37786.	34335.	31317.	29632.	28455.
27324.	26238.	25196.	24195.	23233.	22310.	21423.	20572.	19755.	18970.
18216.	17492.	16797.	16130.	15489.	14873.	14282.	13715.	13170.	12647.
12144.	11661.	11198.	10753.	10326.	9916.	9522.	9143.	8780.	8431.
8096.	7774.	7465.	7169.	6884.	6610.	6348.	6095.	5853.	5621.
5397.	5183.	4977.	4779.	4589.	4407.	4232.	4064.	3902.	3747.
3598.	3455.	3318.	3186.	3060.	2938.	2821.	2709.	2601.	2498.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	228454.	216128.	158354.	72951.	3049500.
CMS	6469.	6120.	4484.	2066.	86352.
INCHES		2.44	7.16	9.89	11.49
MM		62.05	181.85	251.32	291.83
AC-FT		107171.	314091.	434086.	504050.
THOUS CU M		132193.	387426.	535438.	621737.

SUM OF 3 HYDROGRAPHS AT DAM PLAN 1 RTIO 4

257.	467.	465.	838.	1212.	1210.	4235.	11359.	11725.	6248.
5221.	6286.	8519.	10120.	9443.	13640.	20255.	25932.	73182.	185726.
247618.	253665.	294036.	326363.	314299.	277164.	236037.	195846.	160930.	132116.
108512.	89194.	73604.	66124.	59630.	53980.	49051.	44739.	42332.	40650.
39034.	37483.	35994.	34564.	33190.	31871.	30605.	29389.	28221.	27100.
26023.	24989.	23996.	23042.	22127.	21248.	20403.	19593.	18814.	18066.
17349.	16659.	15997.	15362.	14751.	14165.	13602.	13062.	12543.	12044.
11566.	11106.	10665.	10241.	9834.	9443.	9068.	8708.	8362.	8030.
7710.	7404.	7110.	6827.	6556.	6296.	6045.	5805.	5575.	5353.

5140. 4936. 4740. 4552. 4371. 4197. 4030. 3870. 3716. 3569.

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME

CFS	326363.	308754.	226221.	104215.	0356429.
CMS	9242.	8743.	6406.	2951.	123361.
INCHES		3.49	10.23	14.14	16.41
MM		88.64	259.79	359.04	416.90
AC-FT		153131.	448702.	620123.	720071.
THOUS CU M		188848.	553466.	764911.	888195.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE INFLOW THROUGH CAYUGA LAKE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.0	0.0	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
20	0	0	0.0	0.0	0.0	-383.	1

CAPACITY=	0.	486000.	570760.	655760.	740760.	825760.	910760.	995760.	1080760.	1165760.
ELEVATION=	372.	383.	385.	387.	389.	391.	393.	395.	397.	399.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
371.5	180.0	3.1	1.5	0.0	0.0	0.0	0.0

IABCOA	ISPCTW	SS	NGATES	DESHD	APEL	APWID	APLOSS	PDPTH	ELTSUR
10	0	0.0	0.	12.0	371.5	300.0	0.0	11.5	383.0

371.50	0.	0.	0.0	0.	0.	0.0	0.	0.	0.
383.00	486000.	21389.	379.2	21389.	0.	0.0	0.	21389.	21389.
385.00	570760.	27320.	380.5	27320.	0.	0.0	0.	27320.	27320.
387.00	655760.	33721.	381.8	33721.	0.	0.0	0.	33721.	33721.
389.00	740760.	40425.	383.2	40425.	0.	0.0	0.	40425.	40425.
391.00	825760.	47513.	384.5	47513.	0.	0.0	0.	47513.	47513.
393.00	910760.	54963.	385.8	54963.	0.	0.0	0.	54963.	54963.
395.00	995760.	62759.	387.2	62759.	0.	0.0	0.	62759.	62759.
397.00	1080760.	70883.	388.5	70883.	0.	0.0	0.	70883.	70883.
399.00	1165760.	79322.	389.8	79322.	0.	0.0	0.	79322.	79322.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
387.2	2.6	1.5	1000.

STATION DAM, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

21235.	21083.	20931.	20782.	20635.	20490.	20351.	20232.	20127.	20018.

19890.	19766.	19650.	19541.	19435.	19336.	19257.	19201.	19242.	19572.
20215.	20977.	22068.	23598.	25168.	26579.	27781.	28773.	29520.	30062.
30434.	30669.	30793.	30844.	30852.	30821.	30759.	30668.	30558.	30437.

30307.	30168.	30022.	29869.	29709.	29543.	29371.	29193.	29010.	28822.
28630.	28433.	28233.	28029.	27822.	27612.	27399.	27184.	26991.	26787.
26581.	26373.	26164.	25953.	25741.	25528.	25314.	25100.	24885.	24670.
24454.	24238.	24022.	23806.	23590.	23374.	23158.	22943.	22728.	22514.
22301.	22088.	21875.	21664.	21453.	21297.	21165.	21033.	20902.	20770.
20638.	20507.	20376.	20245.	20115.	19984.	19854.	19725.	19596.	19467.

STORAGE

482499.	479031.	475598.	472204.	468866.	465567.	462417.	459707.	457326.	454751.
451927.	449125.	446479.	444011.	441598.	439348.	437559.	436289.	437207.	444698.
459317.	476627.	495701.	517564.	540007.	560171.	576885.	590058.	599983.	607168.
612112.	615232.	616879.	617559.	617657.	617255.	616423.	615222.	613760.	612148.
610421.	608585.	606646.	604612.	602488.	600280.	597993.	595632.	593202.	590709.
588156.	585548.	582889.	580183.	577433.	574644.	571819.	568960.	566069.	563149.
560202.	557231.	554238.	551227.	548199.	545157.	542102.	539038.	535965.	532885.
529801.	526714.	523625.	520536.	517449.	514364.	511283.	508208.	505139.	502077.
499024.	495980.	492946.	489924.	486914.	483912.	480912.	477915.	474919.	471927.
468938.	465954.	462975.	460002.	457035.	454075.	451123.	448178.	445242.	442315.

STAGE

382.9	382.8	382.8	382.7	382.6	382.5	382.4	382.4	382.3	382.3
382.2	382.1	382.1	382.0	381.9	381.9	381.9	381.8	381.8	382.0
382.4	382.8	383.2	383.7	384.3	384.8	385.1	385.5	385.7	385.9
386.0	386.0	386.1	386.1	386.1	386.1	386.1	386.0	386.0	386.0
385.9	385.9	385.8	385.8	385.7	385.7	385.6	385.6	385.5	385.5
385.4	385.3	385.3	385.2	385.2	385.1	385.0	385.0	384.9	384.8
384.8	384.7	384.6	384.5	384.5	384.4	384.3	384.3	384.2	384.1
384.0	384.0	383.9	383.8	383.7	383.7	383.6	383.5	383.5	383.4
383.3	383.2	383.2	383.1	383.0	383.0	382.9	382.8	382.7	382.7
382.6	382.5	382.5	382.4	382.3	382.2	382.2	382.1	382.0	382.0

PEAK OUTFLOW IS 30852. AT TIME 70.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	30852.	30834.	30605.	29144.	2421329.
CMS	874.	873.	867.	825.	68565.
INCHES		0.35	1.38	3.95	9.12
MM		8.85	35.15	100.40	231.72
AC-FT		15290.	60703.	173417.	400220.
THOUS CU M		18850.	74877.	213906.	493664.

STATION DAM, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

21235.	21083.	20932.	20783.	20637.	20493.	20356.	20243.	20146.	20039.
19919.	19799.	19688.	19586.	19487.	19395.	19329.	19289.	19365.	19787.
20586.	21608.	23248.	25121.	27042.	28882.	30429.	31656.	32588.	33273.
33756.	34087.	34278.	34377.	34422.	34417.	34370.	34289.	34184.	34063.
33932.	33790.	33641.	33487.	33324.	33153.	32975.	32790.	32598.	32400.
32196.	31987.	31773.	31555.	31332.	31105.	30875.	30642.	30405.	30166.
29924.	29680.	29434.	29186.	28937.	28686.	28435.	28182.	27928.	27674.
27419.	27175.	26938.	26700.	26462.	26225.	25987.	25749.	25512.	25275.
25039.	24803.	24568.	24334.	24100.	23867.	23636.	23405.	23175.	22946.
22718.	22492.	22267.	22043.	21820.	21599.	21383.	21245.	21107.	20970.

STORAGE

482503. 479041. 475615. 472232. 468911. 465632. 462526. 459944. 457751. 455321.
452587. 449875. 447346. 445025. 442766. 440697. 439177. 438276. 439996. 449599.

467750.	489120.	512572.	539338.	566795.	591502.	612048.	628333.	640715.	649803.
656196.	660392.	662815.	664070.	664620.	664564.	663988.	662965.	661623.	660098.
658430.	656627.	654698.	652649.	650487.	648219.	645852.	643392.	640845.	638216.
635512.	632737.	629896.	626995.	624038.	621028.	617971.	614870.	611730.	608553.
605343.	602103.	598837.	595547.	592237.	588908.	585565.	582208.	578840.	575464.
572082.	568694.	565302.	561905.	558507.	555109.	551712.	548318.	544928.	541543.
538165.	534796.	531435.	528085.	524746.	521419.	518105.	514805.	511519.	508250.
504996.	501759.	498540.	495339.	492156.	488993.	485849.	482718.	479594.	476477.

STAGE

382.9	382.8	382.8	382.7	382.6	382.5	382.4	382.4	382.3	382.3
382.2	382.1	382.1	382.0	382.0	381.9	381.9	381.9	381.9	382.1
382.6	383.1	383.6	384.3	384.9	385.5	386.0	386.4	386.6	386.9
387.0	387.1	387.2	387.2	387.2	387.2	387.2	387.2	387.1	387.1
387.1	387.0	387.0	386.9	386.9	386.8	386.8	386.7	386.6	386.6
386.5	386.5	386.4	386.3	386.3	386.2	386.1	386.0	386.0	385.9
385.8	385.7	385.7	385.6	385.5	385.4	385.3	385.3	385.2	385.1
385.0	385.0	384.9	384.8	384.7	384.6	384.6	384.5	384.4	384.3
384.2	384.2	384.1	384.0	383.9	383.8	383.8	383.7	383.6	383.5
383.4	383.4	383.3	383.2	383.1	383.1	383.0	382.9	382.8	382.8

PEAK OUTFLOW IS 34422. AT TIME 70.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	34422.	34404.	34159.	32598.	2650315.
CMS	975.	974.	967.	923.	75049.
INCHES		0.39	1.54	4.42	9.99
MM		9.88	39.23	112.30	253.63
AC-FT		17050.	67753.	193970.	438069.
THOUS CU M		21043.	83572.	239259.	540350.

STATION DAM, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

21236.	21084.	20933.	20785.	20639.	20496.	20361.	20253.	20165.	20064.
19948.	19832.	19726.	19631.	19538.	19455.	19400.	19376.	19487.	20003.
20957.	22480.	24426.	26642.	29035.	31237.	33072.	34603.	36397.	37968.
39161.	39971.	40442.	40679.	40773.	40744.	40613.	40395.	40120.	39816.
39493.	39153.	38800.	38435.	38062.	37681.	37297.	36911.	36526.	36144.
35768.	35401.	35047.	34713.	34412.	34162.	33908.	33654.	33404.	33150.
32893.	32634.	32371.	32107.	31840.	31571.	31301.	31029.	30756.	30482.
30207.	29932.	29656.	29379.	29103.	28826.	28550.	28273.	27997.	27722.
27447.	27183.	26929.	26676.	26423.	26171.	25920.	25669.	25420.	25172.
24924.	24678.	24434.	24190.	23948.	23707.	23467.	23229.	22993.	22758.

STORAGE

482507.	479052.	475633.	472261.	468956.	465697.	462635.	460181.	458176.	455891.
453248.	450626.	448213.	446038.	443933.	442046.	440796.	440263.	442785.	454500.
476184.	501594.	529402.	561073.	593534.	622770.	647145.	666537.	681309.	692116.
699662.	704560.	707332.	708712.	709255.	709091.	708327.	707058.	705441.	703636.
701691.	699618.	697426.	695125.	692723.	690227.	687645.	684982.	682246.	679441.
676571.	673640.	670652.	667608.	664508.	661350.	658134.	654864.	651544.	648178.
644768.	641320.	637837.	634322.	630780.	627212.	623622.	620014.	616389.	612750.
609100.	605442.	601777.	598107.	594435.	590763.	587092.	583424.	579762.	576105.
572456.	568815.	565183.	561559.	557945.	554342.	550751.	547173.	543609.	540060.

536527. 533011. 529512. 526031. 522568. 519126. 515703. 512301. 508920. 505560.

STAGE

382.9	382.8	382.8	382.7	382.6	382.5	382.4	382.4	382.3	382.3
382.2	382.2	382.1	382.1	382.0	382.0	381.9	381.9	382.0	382.3
382.8	383.4	384.0	384.8	385.5	386.2	386.8	387.3	387.6	387.9
388.0	388.1	388.2	388.2	388.3	388.3	388.2	388.2	388.2	388.1
388.1	388.0	388.0	387.9	387.9	387.8	387.8	387.7	387.6	387.6
387.5	387.4	387.4	387.3	387.2	387.1	387.1	387.0	386.9	386.8
386.7	386.7	386.6	386.5	386.4	386.3	386.2	386.2	386.1	386.0
385.9	385.8	385.7	385.6	385.6	385.5	385.4	385.3	385.2	385.1
385.0	385.0	384.9	384.8	384.7	384.6	384.5	384.4	384.4	384.3
384.2	384.1	384.0	383.9	383.9	383.8	383.7	383.6	383.5	383.5

PEAK OUTFLOW IS 40773. AT TIME 70.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40773.	40721.	40098.	37001.	2910035.
CMS	1155.	1153.	1135.	1048.	82403.
INCHES		0.46	1.81	5.02	10.96
MM		11.69	46.05	127.48	278.49
AC-FT		20192.	79534.	220174.	480998.
THOUS CU M		24907.	98103.	271581.	593302.

STATION DAM, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

21236.	21085.	20935.	20788.	20645.	20504.	20375.	20284.	20221.	20139.
20035.	19932.	19841.	19764.	19692.	19633.	19614.	19639.	19856.	20650.
22470.	25094.	28002.	31494.	35396.	41981.	48858.	54939.	59740.	63260.
65635.	67044.	67665.	67761.	67549.	67084.	66418.	65595.	64671.	63708.
62725.	61726.	60715.	59696.	58672.	57646.	56620.	55598.	54582.	53573.
52573.	51584.	50608.	49646.	48698.	47767.	46853.	45973.	45115.	44275.
43455.	42655.	41876.	41118.	40383.	39671.	38982.	38318.	37679.	37067.
36483.	35930.	35412.	34933.	34508.	34172.	33850.	33535.	33226.	32916.
32606.	32296.	31987.	31677.	31368.	31059.	30752.	30444.	30138.	29833.
29529.	29226.	28924.	28624.	28325.	28027.	27731.	27437.	27157.	26887.

STORAGE

482520.	479082.	475686.	472346.	469091.	465891.	462962.	460891.	459451.	457601.
455228.	452876.	450813.	449080.	447436.	446094.	445652.	446225.	451152.	469202.
501452.	538949.	579825.	626181.	673600.	716087.	750993.	778107.	798115.	812169.
821403.	826777.	829098.	829454.	828664.	826927.	824409.	821250.	817680.	813928.
810064.	806103.	802056.	797936.	793753.	789517.	785237.	780921.	776576.	772210.
767828.	763435.	759038.	754640.	750245.	745858.	741480.	737114.	732760.	728421.
724097.	719791.	715504.	711237.	706990.	702764.	698558.	694373.	690209.	686064.
681936.	677825.	673729.	669643.	665563.	661480.	657388.	653289.	649182.	645070.
640956.	636841.	632728.	628619.	624514.	620417.	616329.	612251.	608184.	604131.
600092.	596070.	592063.	588075.	584106.	580157.	576229.	572322.	568438.	564573.

STAGE

382.9	382.8	382.8	382.7	382.6	382.5	382.5	382.4	382.4	382.3
382.3	382.2	382.2	382.1	382.1	382.1	382.0	382.1	382.2	382.6
383.4	384.2	385.2	386.3	387.4	388.4	389.2	389.9	390.3	390.7
390.9	391.0	391.1	391.1	391.1	391.0	391.0	390.9	390.8	390.7
390.6	390.5	390.4	390.3	390.2	390.1	390.0	389.9	389.8	389.7
389.6	389.5	389.4	389.3	389.2	389.1	389.0	388.9	388.8	388.7
388.6	388.5	388.4	388.3	388.2	388.1	388.0	387.9	387.8	387.7

387.6	387.5	387.4	387.3	387.	387.1	387.0	386.9	386.8	386.7
386.7	386.6	386.5	386.4	386.3	386.2	386.1	386.0	385.9	385.8
385.7	385.6	385.5	385.4	385.3	385.2	385.1	385.0	384.9	384.9

PEAK OUTFLOW IS 67761. AT TIME 68.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67761.	67574.	65696.	56676.	3860013.
CMS	1919.	1913.	1860.	1605.	109304.
INCHES		0.76	2.97	7.69	14.54
MM		19.40	75.44	195.26	369.40
AC-FT		33508.	130305.	337247.	638019.
THOUS CU M		41331.	160730.	415989.	786985.

********** ********** ********** ********** **********

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.50	RATIO 2 0.60	RATIO 3 0.70	RATIO 4 1.00
HYDROGRAPH AT	1	66.00	1	59755.	71706.	83657.	119510.
		(170.94)		(1692.08)(	2030.50)(	2368.91)(	3384.16)(
HYDROGRAPH AT	2	303.00	1	56961.	68354.	79746.	113923.
		(784.77)		(1612.97)(	1935.56)(	2258.16)(	3225.94)(
HYDROGRAPH AT	3	454.00	1	109391.	131269.	153147.	218782.
		(1175.86)		(3097.61)(	3717.13)(	4336.65)(	6195.21)(
3 COMBINED	DAM	823.00	1	163181.	195818.	228454.	326363.
		(2131.57)		(4620.79)(	5544.95)(	6469.10)(	9241.58)(
ROUTED TO	DAM	823.00	1	30852.	34422.	40773.	67761.
		(2131.57)		(873.62)(	974.73)(	1154.56)(	1918.77)(

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	383.00	371.50	387.20
STORAGE	486000.	0.	664260.
OUTFLOW	21389.	0.	34392.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	386.10	0.0	617657.	30852.	0.0	70.00	0.0
0.60	387.21	0.01	664620.	34422.	4.00	70.00	0.0
0.70	388.26	1.06	709255.	40773.	56.00	70.00	0.0
1.00	391.09	3.89	829454.	67761.	102.00	68.00	0.0

APPENDIX D

REFERENCES

GENERAL

Martin, R.J., 1974, Flood Plain Management Study, prepared for Tompkins County Department of Planning, Ithaca, New York.

New York State Museum and Science Service, 1961, Geologic Map of New York, Finger Lakes Sheet.

University of the State of New York, reprinted 1973, Geology of New York, Education Leaflet 20.

Von Engeln, O.D., 1969, The Finger Lakes Region: Its Origin and Nature, Cornell University Press

HYDRAULICS

Chow, Ven Te, 1959, Open Channel Hydraulics, McGraw Hill.

King, H.W. and E.F. Brater, 1963, Handbook of Hydraulics, 5th Edition, McGraw-Hill

U.S. Army Corps of Engineers:

HEC-1 Flood Hydrograph Package - Dam Safety Version, September 1978.

Engineering Manual 1110-2-1405; Flood-Hydrograph Analyses and Computations, August 1959.

U.S. Department of Agriculture, Soil Conservation Service:

National Engineering Handbook; Section 4 - Hydrology, August 1972.

U.S. Department of Commerce; Weather Bureau:

Hydrometeorological Report No. 33: Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6,12,24, and 48 Hours, April 1956.

U.S. Department of the Interior:

BUREC, 1977, Design of Small Dams, 2nd Ed. (rev. reprint).

USGS, 1980, Water Resources Data For New York, Western New York, USGS Water Data Report NY-80-3.

APPENDIX E

PREVIOUS INSPECTION REPORTS AND AVAILABLE DOCUMENTS

New York State Department of Environmental Conservation

MUD LOCK

D-15-4 (7/76)

DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
369	Oswego	Aurelius	Cayuga	C	9/9/76 KP

Type of Construction

- [ ] Earth w/concrete spillway
- [ ] Earth w/drop inlet pipe
- [ ] Earth w/stone or riprap spillway
- [x] Concrete
- [ ] Stone
- [ ] Timber

Use

- [ ] Water Supply
- [x] ~~Power~~ D.O.T. Lock
- [ ] Recreation
- [ ] Fish and Wildlife
- [ ] Farm Pond
- [ ] No Apparent Use-Abandoned

Estimated Impoundment Size

- [ ] 1-5 acres
- [ ] 5-10 acres
- [x] Over 10 acres

Estimated Height of Dam above Streambed

- [ ] Under 10 feet
- [x] 10-25 feet
- [ ] Over 25 feet

CAPACITY = (17/5) x 66.87 x 640 = 171,187 A.F.
SAY 172,000 A.F (G

Condition of Spillway

- [x] Service satisfactory
- [ ] In need of repair or maintenance
- [x] Auxiliary satisfactory
- [ ] In need of repair or maintenance

Explain: _____

_____

Condition of Non-Overflow Section

- [x] Satisfactory
- [ ] In need of repair or maintenance Explain: _____

_____

Condition of Mechanical Equipment

- [x] Satisfactory
- [ ] In need of repair or maintenance Explain: _____

_____

Evaluation (From Visual Inspection)

- [x] No defects observed beyond normal maintenance
- [ ] Repairs required beyond normal maintenance

S-64-369 Oswego

Form W51. 5-12-16-3000 (16-16786) Acc. 38a

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK
CONSERVATION COMMISSION
ALBANY

DAM REPORT

July 31, 1918
(Date)

CONSERVATION COMMISSION,

DIVISION OF WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Mud Lock Lock 1 C & S Dam.

This dam is situated upon the Seneca River
(Give name of stream)
in the Town of Cicero, Cayuga County,
about 2 Miles from the Village or City of Cayuga
(State distance)
The distance down stream from the dam, to the Free Bridge,
(Up or down) (Give name of nearest important stream or of a bridge)
is about 1 mile.
(State distance)

The dam is now owned by State of N.Y.
(Give name and address in full)
and was built in or about the year —, and was extensively repaired or reconstructed during the year —.

As it now stands, the spillway portion of this dam is built of Concrete & lock gate
(State whether of masonry, concrete or timber)
and the other portions are built of
(State whether of masonry, concrete, earth or timber with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is gravel, and under the remaining portions such foundation bed is "

F. 1

The total length of this dam is.....feet. The spillway or waste-weir portion, is about.....feet long, and the crest of the spillway is about.....feet below the abutment.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows:.....

.....

At the time of this inspection the water level above the dam was.....ft.....in.

be'ow
above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks or erosions which you may have observed.)

This is a state Dam and in fine condition

Reported by Roy W. Johnson
(Signature)

Dunkirk
(Address—Street and number, P. O. Box or R. F. D. route)

N.Y.
(Name of place)

December 3, 1915.

Hon. Frank M. Williams,
State Engineer,
Albany, N. Y.

Dear Sir:-

Receipt is acknowledged of your letter of November 29, 1915, enclosing sketch for the proposed fishway for dam #1 Cayuga-Seneca Canal.

We prefer a fishway with a slope of about one vertical to four horizontal and a width of four feet with compartments six feet long, the partitions to run obliquely; the top partition to have an opening 18 inches square and the bottom partition an opening 12 inches square and proportional in between.

We enclose herewith a pamphlet on Fishways for Dam, which we hope will be of use to you in this work.

Very truly yours,
GEO. D. PRATT, Commissioner,
By
Division Engineer.

McK/C.
Encl.

INSPECTION GUIDELINES

FOR

3C.000 TAINTOR GATES AND TAINTOR DAMS

The following guidelines are related to the Structure Condition Report for Taintor Gates and Dams (CAN 95) by the numbering system for the various elements.

The inspector should refer to Forms Instruction 900 CAN 95 before filling out the condition report.

3C.100 Stream Channel

.101 Adequacy of Openings
Adequacy may be determined by checking upstream high water level recordings during past years.

.102 Freedom from Erosion & Scour
Upstream and downstream should be scrutnized for any indication of deepening or widening of the lateral dimension of flow area. Check the graph of any bottom profile available from Regional surveys.

.103 Freedom from Obstructions
Debris or vegetation in the Waterways both upstream and downstream may reduce the width of the waterway, contributing to scour. Sand and gravel bars formed in the channel may increase stream velocity and lead to scour.

.104 Bank Protection
Examine the condition and adequacy of existing bank protection. Note whether channel changes are impairing or decreasing the effectiveness of present protection.

3C.200 Substructure

.201 Sills & Aprons
.202 Piers Between Gates
.203 Abutments
.204 Wing Walls
These elements containing concrete are susceptible to scaling, cracking, spalling, movement and rotation. Any of these conditions should be noted. Evidence of movement may be observed by noting any scoring of concrete by sides of gates or excessive wear on gate seal; and also by noting any displacement at joints in the concrete.

3C.300 Superstructure

.301 Gate Skinplate
.302 Side Seal Strips
.303 Bottom Seal Strips
.304 Main Structural Members
.305 Cross Bracing
.309 Railings

All steel elements should be inspected for rust, erosion, cracks, buckles, kinks, fine cracks at stress connections, steel incased in concrete for deterioration or movement at their common exposure and all rivets and bolts for tightness. Seal strips may have become worn to the degree that they no longer seal properly and need replacement.

.306 Counterweights

Determine if the counterweights are sound and properly affixed. Where steel members pass through or are embedded in the concrete check for corrosion of the steel member or rust stains on the concrete. Look for cracks and spalls. Determine if the gates are in balance.

.307 Bearings & Pins

Examine all bearings and pins for weakness, excessive play, corrosion, and undesirable deflection or bending.

.308 Needle Beam Catwalk

Statement .301 thru .305 referring to steel elements shall apply here. All wooden walkways should be inspected for signs of decay, weathering, and wear. The needlebeam should be positioned so that the operator's gears properly mesh with the rack.

.310 Paint

Examine all paint for cracking or chipping, scaling, rust, pimples, and chalking. If paint film has disentegrated, note if the prime coat or surface of metal is exposed. Note if spot or extensive painting is needed. Look for paint failure on horizontal surfaces or those which are most exposed to sunlight or moisture. Give particular attention to areas around rivets and bolts, the ends of beams, the seams of built-up members, the unwelded ends of stiffeners, and any other areas difficult to paint or that retain moisture.

3C.400 Machinery (Electrical)

.401 Motors

Determine if there is ample wear length on brushes, ventilating openings are unobstructed and any abnormal vibration. The commutator or slip rings should be clean. The motor should be properly lubricated and kept dry.

.402 Gears

The gears are to be properly lubricated, tight on shafts, no broken or cracked teeth, properly meshed and aligned, with no excessive wear.

.403 Bearings

Bearings shall be free of excessive play and properly lubricated.

.404 Wiring

Inspect any exposed wiring for signs of faulty, worn or damaged insulation. Also look for loose wires, poor wire splices, and inadequate securing of ground lines. Check inside of junction boxes for excessive moisture, drain hole, poor wire splices, and loose connections. Covers for junction outlets and switch boxes should be in place. Determine insulation resistance value.

.405 Starters, Switches

Check contacts of motor starters, limit switches and overtravel switches for pitting. Mechanical linkage should be clean, dry, and lubricated. Contactor coils are to be clean and leads secure.

.406 Overload Protection

Determine if the circuits contain the proper amperage circuit breakers and/or fuses.

3C.500 Operators

.501 Hand Wheel Bearings

The bearings should be lubricated, and aligned so that the gears mesh properly. Any excessive wear should be noted.

.502 Hand Wheel Gears

Gears should be checked for tightness and lubrication. Cracked or broken teeth shall be noted.

.503 Housing

The housing assemblies should be free of any cracks or broken areas.

.504 Fasteners

Operator housing assemblies shall be firmly and securely anchored in place. Check for loose or missing nuts, bolts, rivets, etc.

.505 Gear Covers

Gear Covers should be in a position that will protect the gears from weather and to prevent the operator from entanglement while the machinery is in operation.

.506 Locking Devices

Locking Devices should be provided to prevent unauthorized use.

3C.600 Machinery (Lifting)

.601 Pinion Shaft

The pinion shaft should be straight and true. The shaft should also be examined for excessive wear and proper lubrication at at the bearings. Inspect for excessive twisting of the shaft.

.602 Bearings

The pinion shaft bearings shall be free of excessive wear and properly lubricated.

.603 Gears

Check the alignment of all gears, locks, and interlocking devices. There should be adequate lubrication of all movable parts, particularly where meshing or contact occurs. All gears will be inspected for cracked teeth or hub. Keys are to fit tightly in keyways, holding gears firmly on shafts.

.604 Cable Drums

Note if drums are tight on shaft and if the cables are properly aligned on drums. Excessive wear of drum groves should be noted.

.605 Rack Segments

Inspect rack segments for excessive wear, broken or missing teeth, proper lubrication and alignment for mesh with the pinion gear.

.606 Lifting Cables

Lifting cables should be inspected for wear damage, corrosion and inadequate lubrication. Cable connectors must be secure.

.607 Couplings

Couplings shall be tight on shafts with all flange bolts in place and tight.

3C.700 Gate Bearing Points

Examine all bearings and pins for weakness, excessive play, corrosion, and undesirable deflection or bending.

Code 900 CAN 9

FORMS INSTRUCTION

Subj: Condition Report for
Taintor Gates and Taintor Dams

PURPOSE

For recording the results of field inspections of all taintor gates and taintor dams maintained by the Waterways Maintenance Subdivision. This form is also the source of input to the EDP program for listing the condition information.

PREPARATION

Completed in the field, in black ball point or black felt tipped pen, by the person performing the inspection. One form is used for each structure to be inspected.

1. The field inspector fills out the heading and enters the year and month when the inspection was performed in the boxes provided. Enter single digit months in the rightmost box.

2. Boxes 1 thru 7 - Structure Identification Number. The field inspector enters the number for the taintor gate or taintor dam being inspected. The number is obtained from the EDP Listing of the Structure Inventory.

3. Boxes 8 thru 49 inclusive (except for boxes 28 and 29). The rating numbers to be inserted in these boxes by the field inspector are as follows:

9 - Excellent
7 - Good
5 - Fair
3 - Poor
1 - Poor minus

Criteria for applying these ratings to the various elements of the structure may be found in section 3C.000 of the Maintenance Quality Manual.

NOTE: There must be an entry in every box.

a. If there is no such element on the structure - enter N
b. If the element is submerged or otherwise inaccessible - enter X

4. Where the item to be rated covers more than one element on both the left and right (for example - bank protection, piers between gates); enter an overall rating in the proper box and indicate any particularly bad conditions in the adjacent comments section.

PREPARATION - Cont'd.

5. If the designation left or right is used under Comments, it must be in reference to the structure when facing downstream.

6. Box 50. The Regional Waterways Engineer only, enters one of the following rating numbers in this box:

   9 - Good condition - no repairs necessary.
   7 - Preventive maintenance or minor repairs needed.
   5 - Major repairs needed - deferred scheduling.
   3 - Major repairs needed - schedule within one year.
   1 - Immediate attention needed - schedule as soon as possible.

7. The Regional Waterways Engineer will sign the completed form where indicated opposite box 50.

DISPOSITION

1. The Regional Waterways Engineer will have two copies made of the original report. He will then forward the original and one copy to the Waterways Maintenance Subdivision - Main Office. The other copy will be retained in the Regional Waterways Office files.

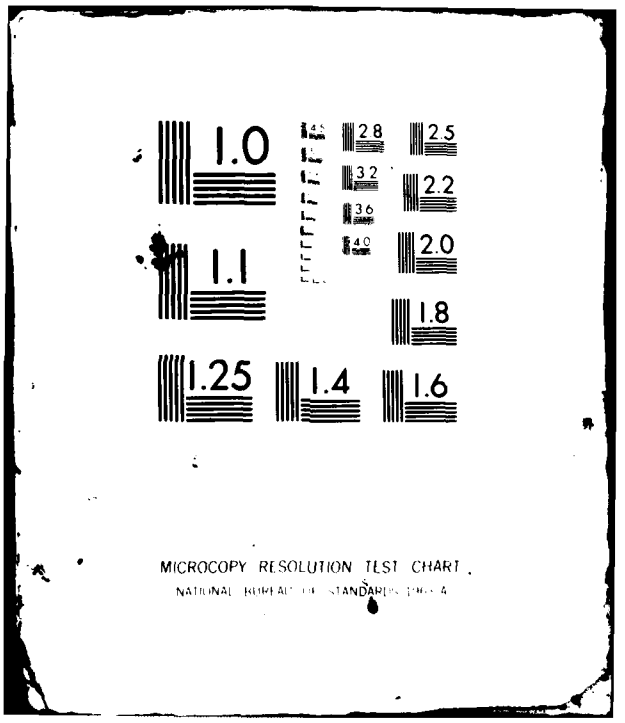
2. The Waterways Maintenance Subdivision - Main Office will review the form for completeness and reasonableness of entries. The original will be kept in that office and the copy will be forwarded to the Bureau of Data Services for processing into the data file.

RELATED FORMS

None

AD-A109 968 METCALF AND EDDY OF NEW YORK INC NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. MUD LOCK C&S CANAL DAM (INVENTORY --ETC(U)
SEP 81 G P FULTON DACW51-81-C-0044
UNCLASSIFIED NL

END
DATE FILMED
3 82
DTIC


1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS

CAN 95 (4/72)

DEPARTMENT OF TRANSPORTATION
WATERWAYS MAINTENANCE SUBDIVISION

TAINTOR GATES & DAMS

B. Aldrich

7 3 YEAR 0 2 MONTH — CONDITION REPORT — INSPECTED BY

HISTORIC NAME Movable Dam-Taintor Type-Lock 1 TITLE ACE

STRUCTURE IDENTIFICATION NO W [SECT 6] [HISTORIC NO 3 0 0 1] [TYPE 3 C]
(1) (2–5) (6 7)

			COMMENTS
3C.100	STREAM CHANNEL		
.101	ADEQUACY OF OPENINGS	7 (8)	
.102	FREEDOM FROM EROSION & SCOUR	7 (9)	
.103	FREEDOM FROM OBSTRUCTIONS	7 (10)	
.104	BANK PROTECTION	7 (11)	
3C.200	SUBSTRUCTURE		
.201	SILLS & APRONS	X (12)	substantial leakage
.202	PIERS BETWEEN GATES	7 (13)	some scaling
.203	ABUTMENTS	7 7 (14 15)	
.204	WING WALLS	5 7 (16 17)	
3C.300	SUPERSTRUCTURE		
.301	GATE SKINPLATE	X (18)	Fair - some need replacement
.302	SIDE SEAL STRIPS	5 (19)	All leak
.303	BOTTOM SEAL STRIPS	X (20)	substantial leakage
.304	MAIN STRUCTURAL MEMBERS	7 (21)	
.305	CROSS BRACING	5 (22)	
.306	COUNTERWEIGHTS	7 (23)	
.307	BEARINGS & PINS	7 (24)	
.308	NEEDLE BEAM CATWALK	7 (25)	Remove sand from under Wood walk
.309	RAILINGS	7 (26)	
.310	PAINT	5 (27)	
(OVER)	YEAR LAST PAINTED	7 1	

JAN 95 REVERSE

			COMMENTS
3C.400	MACHINERY, ELECTRICAL		
.401	MOTORS	N 30	
.402	GEARS	N 31	
.403	BEARINGS	N 32	
.404	WIRING	N 33	
.405	STARTERS, SWITCHES	N 34	
.406	OVERLOAD PROTECTION	N 35	
3C.500	OPERATORS		
.501	HAND WHEEL BEARINGS	7 36	
.502	HAND WHEEL GEARS	7 37	
.503	HOUSING	7 38	
.504	FASTENERS	7 39	
.505	GEAR COVERS	7 40	
.506	LOCKING DEVICES	7 41	
3C.600	MACHINERY, LIFTING		
.601	PINION SHAFT	7 42	
.602	BEARINGS	7 43	
.603	GEARS	7 44	
.604	CABLE DRUMS	N 45	
.605	RACK SEGMENTS	7 46	
.606	LIFTING CABLES	N 47	
.607	COUPLINGS	7 48	
3C.700	GATE PIVOT BEARING POINTS	7 49	
GENERAL RECOMMENDATION		7 50	M.D. Hewitson REGIONAL WATERWAYS ENGINEER

OVERALL COMMENT _____

CAN 95 (4/72)

DEPARTMENT OF TRANSPORTATION
WATERWAYS MAINTENANCE SUBDIVISION

TAINTOR GATES & DAMS

E. Aldrich

7 9 YEAR ☐☐ MONTH CONDITION REPORT INSPECTED BY ____

HISTORIC NAME Movable Dam - Taintor Type - Lock 1 TITLE ACE

STRUCTURE IDENTIFICATION NO W [6] [7001] [3C]
(SECT 1 | HISTORIC NO 2–5 | TYPE 6–7)

			COMMENTS
3C.100	STREAM CHANNEL		
.101	ADEQUACY OF OPENINGS	7 (8)	
.102	FREEDOM FROM EROSION & SCOUR	7 (9)	
.103	FREEDOM FROM OBSTRUCTIONS	7 (10)	
.104	BANK PROTECTION	7 (11)	
3C.200	SUBSTRUCTURE		
.201	SILLS & APRONS	X (12)	
.202	PIERS BETWEEN GATES	3 (13)	
.203	ABUTMENTS	7 7 (14 15)	
.204	WING WALLS	5 7 (16 17)	
3C.300	SUPERSTRUCTURE		
.301	GATE SKINPLATE	X (18)	
.302	SIDE SEAL STRIPS	3 (19)	
.303	BOTTOM SEAL STRIPS	X (20)	
.304	MAIN STRUCTURAL MEMBERS	7 (21)	
.305	CROSS BRACING	4 (22)	
.306	COUNTERWEIGHTS	7 (23)	
.307	BEARINGS & PINS	7 (24)	
.308	NEEDLE BEAM CATWALK	7 (25)	
.309	RAILINGS	6 (26)	
.310	PAINT	5 (27)	
(OVER)	YEAR LAST PAINTED	7 1 (28 29)	

CAN 95 REVERSE

			COMMENTS
3C.400	MACHINERY, ELECTRICAL		
.401	MOTORS	N 30	
.402	GEARS	N 31	
.403	BEARINGS	N 32	
.404	WIRING	N 33	
.405	STARTERS, SWITCHES	N 34	
.406	OVERLOAD PROTECTION	N 35	
3C.500	OPERATORS		
.501	HAND WHEEL BEARINGS	7 36	
.502	HAND WHEEL GEARS	7 37	
.503	HOUSING	7 38	
.504	FASTENERS	7 39	
.505	GEAR COVERS	7 40	
.506	LOCKING DEVICES	7 41	
3C.600	MACHINERY, LIFTING		
.601	PINION SHAFT	7 42	
.602	BEARINGS	3 43	
.603	GEARS	5 44	
.604	CABLE DRUMS	N 45	
.605	RACK SEGMENTS	5 46	
.606	LIFTING CABLES	N 47	
.607	COUPLINGS	7 48	
3C.700	GATE PIVOT BEARING POINTS	5 49	
GENERAL RECOMMENDATION		4 50	L. Burns REGIONAL WATERWAYS ENGINEER

OVERALL COMMENT _____

CAN 95 (4/72)

DEPARTMENT OF TRANSPORTATION
WATERWAYS MAINTENANCE SUBDIVISION

TAINTOR GATES & DAMS

E. Aldrich

[7 7] YEAR [ ] MONTH — CONDITION REPORT — INSPECTED BY _____

HISTORIC NAME Movable Dam-Taintor Type - Lock 1 TITLE ACE

STRUCTURE IDENTIFICATION NO W [6] [ ] [0 0 1] [ ] [C] (SEC / HISTORIC NO / TYPE)

			COMMENTS
3C.100	STREAM CHANNEL		
.101	ADEQUACY OF OPENINGS	[7]	
.102	FREEDOM FROM EROSION & SCOUR	[7]	
.103	FREEDOM FROM OBSTRUCTIONS	[7]	
.104	BANK PROTECTION	[7]	
3C.200	SUBSTRUCTURE		
.201	SILLS & APRONS	[X]	
.202	PIERS BETWEEN GATES	[5]	
.203	ABUTMENTS	[7 7]	
.204	WING WALLS	[5 7]	
3C.300	SUPERSTRUCTURE		
.301	GATE SKINPLATE	[X]	
.302	SIDE SEAL STRIPS	[3]	
.303	BOTTOM SEAL STRIPS	[X]	
.304	MAIN STRUCTURAL MEMBERS	[7]	
.305	CROSS BRACING	[4]	
.306	COUNTERWEIGHTS	[7]	
.307	BEARINGS & PINS	[7]	
.308	NEEDLE BEAM CATWALK	[7]	
.309	RAILINGS	[6]	
.310	PAINT	[3]	
(OVER)	YEAR LAST PAINTED	[7 1]	

CAN 95 REVERSE

			COMMENTS
3C.400	MACHINERY, ELECTRICAL		
.401	MOTORS	N 30	
.402	GEARS	N 31	
.403	BEARINGS	N 32	
.404	WIRING	N 33	
.405	STARTERS, SWITCHES	N 34	
.406	OVERLOAD PROTECTION	N 35	
3C.500	OPERATORS		
.501	HAND WHEEL BEARINGS	7 36	
.502	HAND WHEEL GEARS	7 37	
.503	HOUSING	7 38	
.504	FASTENERS	7 39	
.505	GEAR COVERS	7 40	
.506	LOCKING DEVICES	7 41	
3C.600	MACHINERY, LIFTING		
.601	PINION SHAFT	7 42	
.602	BEARINGS	3 43	
.603	GEARS	5 44	
.604	CABLE DRUMS	N 45	
.605	RACK SEGMENTS	5 46	
.606	LIFTING CABLES	N 47	
.607	COUPLINGS	7 48	
3C.700	GATE PIVOT BEARING POINTS	5 49	
GENERAL RECOMMENDATION		4 50	L. Burns REGIONAL WATERWAYS ENGINEER

OVERALL COMMENT _____

CAN 95 (4/72)

DEPARTMENT OF TRANSPORTATION
WATERWAYS MAINTENANCE SUBDIVISION

TAINTOR GATES & DAMS

R. Aldrich

7 5 YEAR [ ] 5 MONTH CONDITION REPORT INSPECTED BY

HISTORIC NAME Movable Dam - Taintor Type - Lock 1 TITLE ACE

STRUCTURE IDENTIFICATION NO W [6] SEQ [5001] HISTORIC NO [3C] TYPE
(1 | 2 5 | 6 7)

			COMMENTS
3C.100	STREAM CHANNEL		
.101	ADEQUACY OF OPENINGS	7 (8)	
.102	FREEDOM FROM EROSION & SCOUR	7 (9)	
.103	FREEDOM FROM OBSTRUCTIONS	7 (10)	
.104	BANK PROTECTION	7 (11)	
3C.200	SUBSTRUCTURE		
.201	SILLS & APRONS	7 (12)	
.202	PIERS BETWEEN GATES	7 (13)	some scaling
.203	ABUTMENTS	7 7 (14 15)	
.204	WING WALLS	5 7 (16 17)	
3C.300	SUPERSTRUCTURE		
.301	GATE SKINPLATE	X (18)	
.302	SIDE SEAL STRIPS	5 (19)	all leak
.303	BOTTOM SEAL STRIPS	X (20)	
.304	MAIN STRUCTURAL MEMBERS	7 (21)	
.305	CROSS BRACING	5 (22)	
.306	COUNTERWEIGHTS	7 (23)	
.307	BEARINGS & PINS	7 (24)	
.308	NEEDLE BEAM CATWALK	7 (25)	remove sand from beneath walk
.309	RAILINGS	7 (26)	
.310	PAINT	5 (27)	
(OVER)	YEAR LAST PAINTED	7 1 (28 29)	

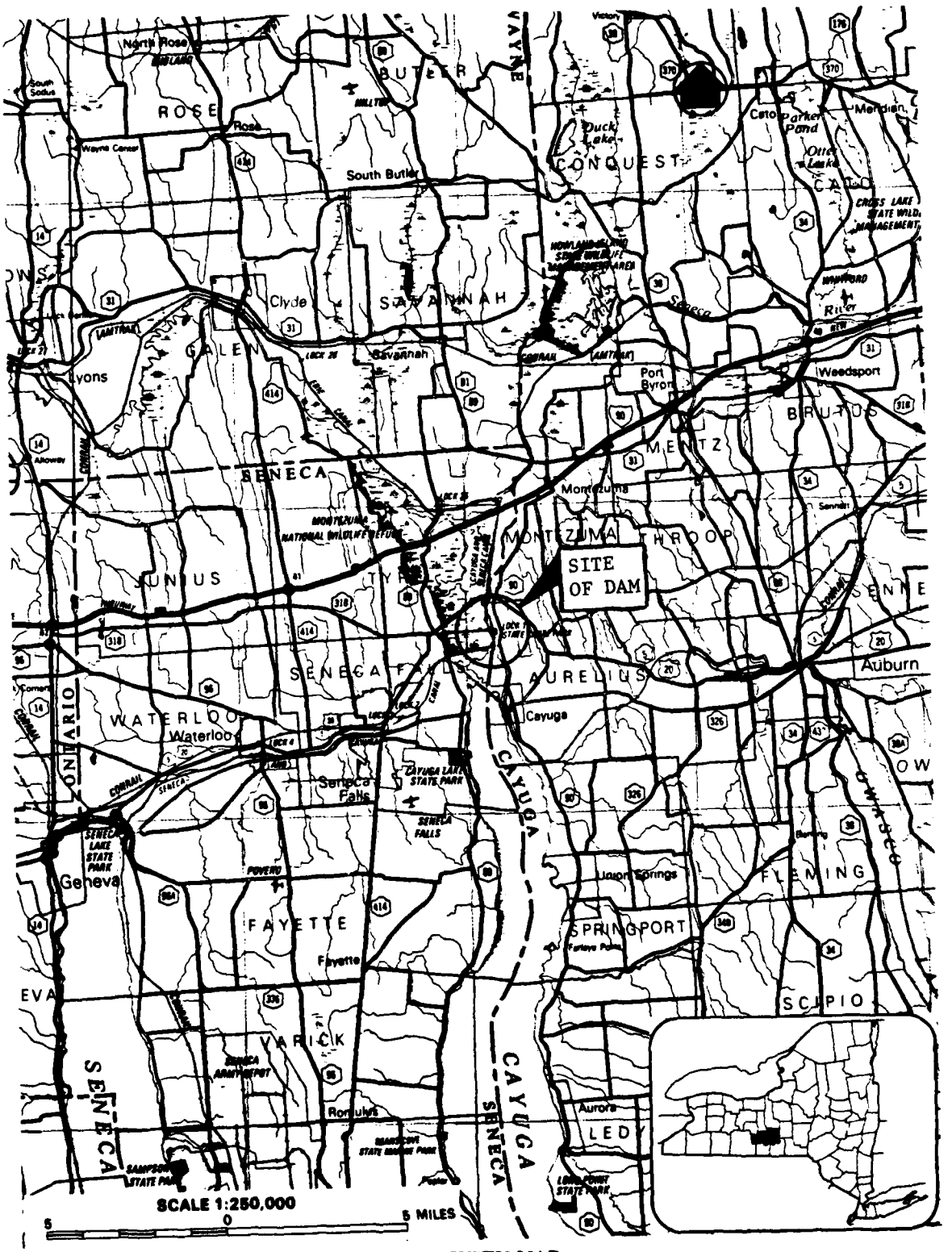
CAN 95 REVERSE

				COMMENTS
3C.400	MACHINERY, ELECTRICAL			
.401	MOTORS		N 30	
.402	GEARS	N	X 31	
.403	BEARINGS	N	X 32	
.404	WIRING		N 33	
.405	STARTERS, SWITCHES		N 34	
.406	OVERLOAD PROTECTION		N 35	
3C.500	OPERATORS			
.501	HAND WHEEL BEARINGS		7 36	
.502	HAND WHEEL GEARS		7 37	
.503	HOUSING		7 38	
.504	FASTENERS		7 39	
.505	GEAR COVERS		7 40	
.506	LOCKING DEVICES		7 41	
3C.600	MACHINERY, LIFTING			
.601	PINION SHAFT		7 42	
.602	BEARINGS		7 43	
.603	GEARS		7 44	
.604	CABLE DRUMS		N 45	
.605	RACK SEGMENTS		7 46	
.606	LIFTING CABLES		N 47	
.607	COUPLINGS		7 48	
3C.700	GATE PIVOT BEARING POINTS		7 49	
GENERAL RECOMMENDATION			5 50	L. Burns REGIONAL WATERWAYS ENGINEER

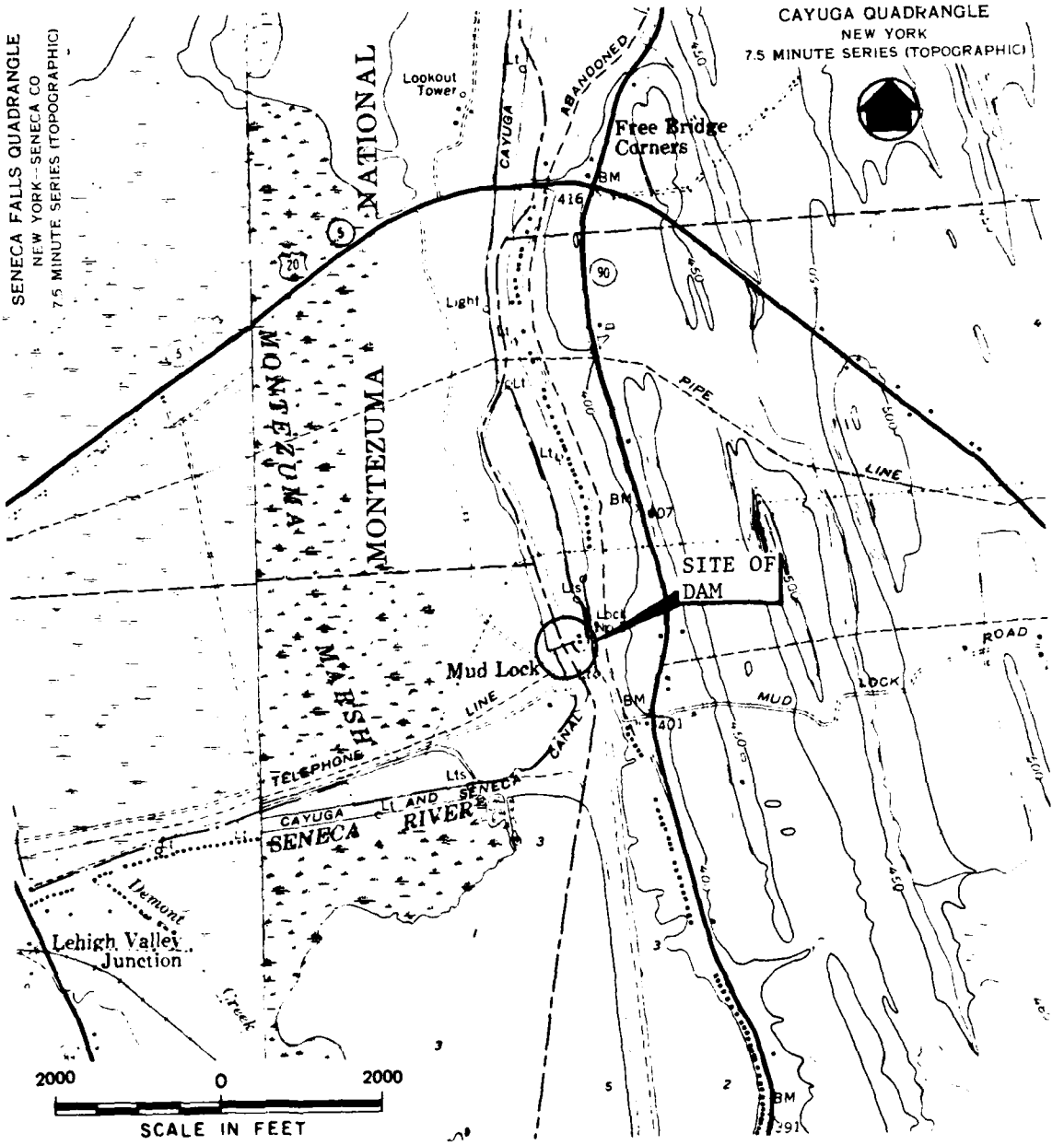
OVERALL COMMENT Generally good but seals should be replaced.

APPENDIX F

DRAWINGS

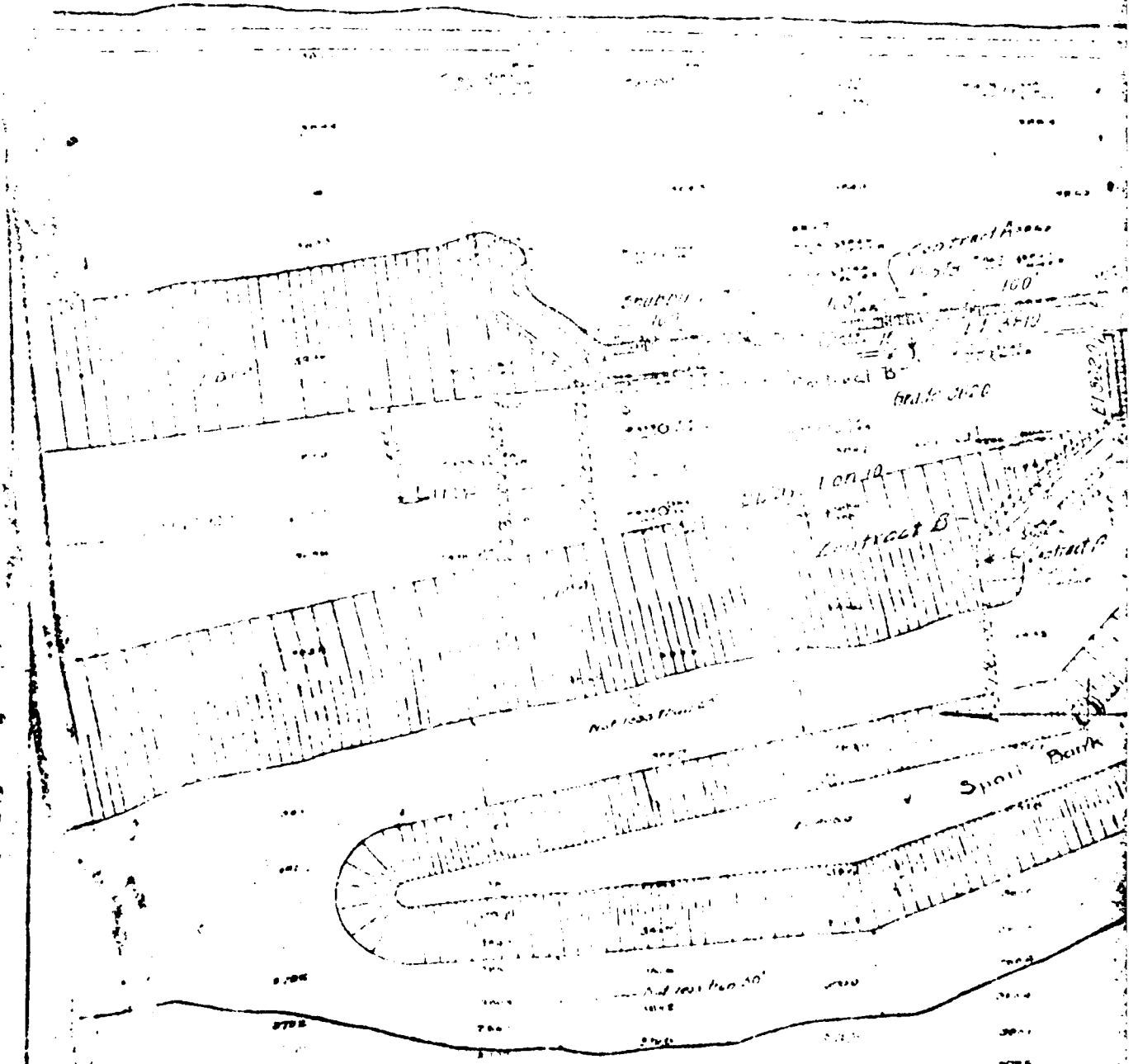


VICINITY MAP
MUD LOCK C&S CANAL DAM
I.D. NO. NY 416

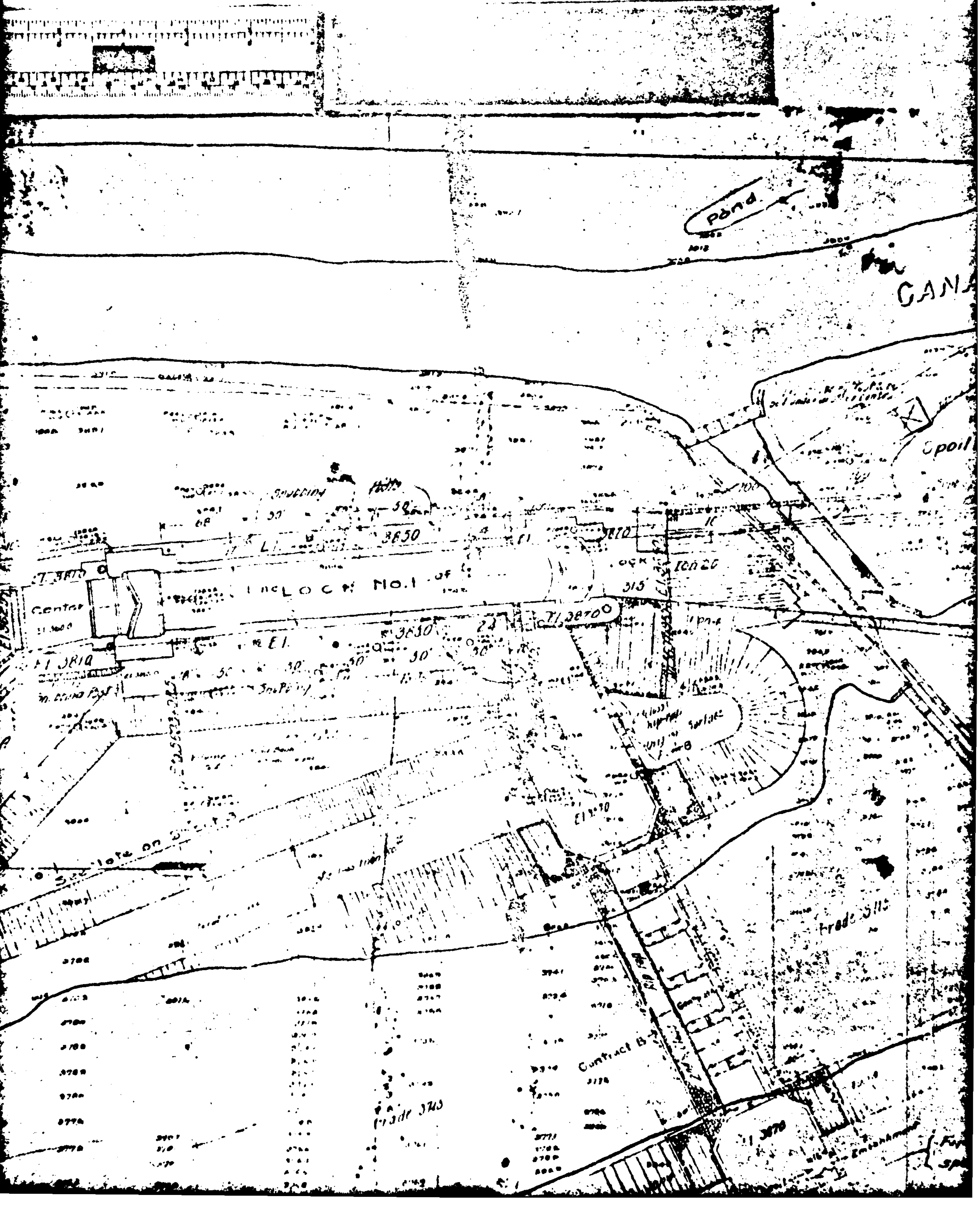


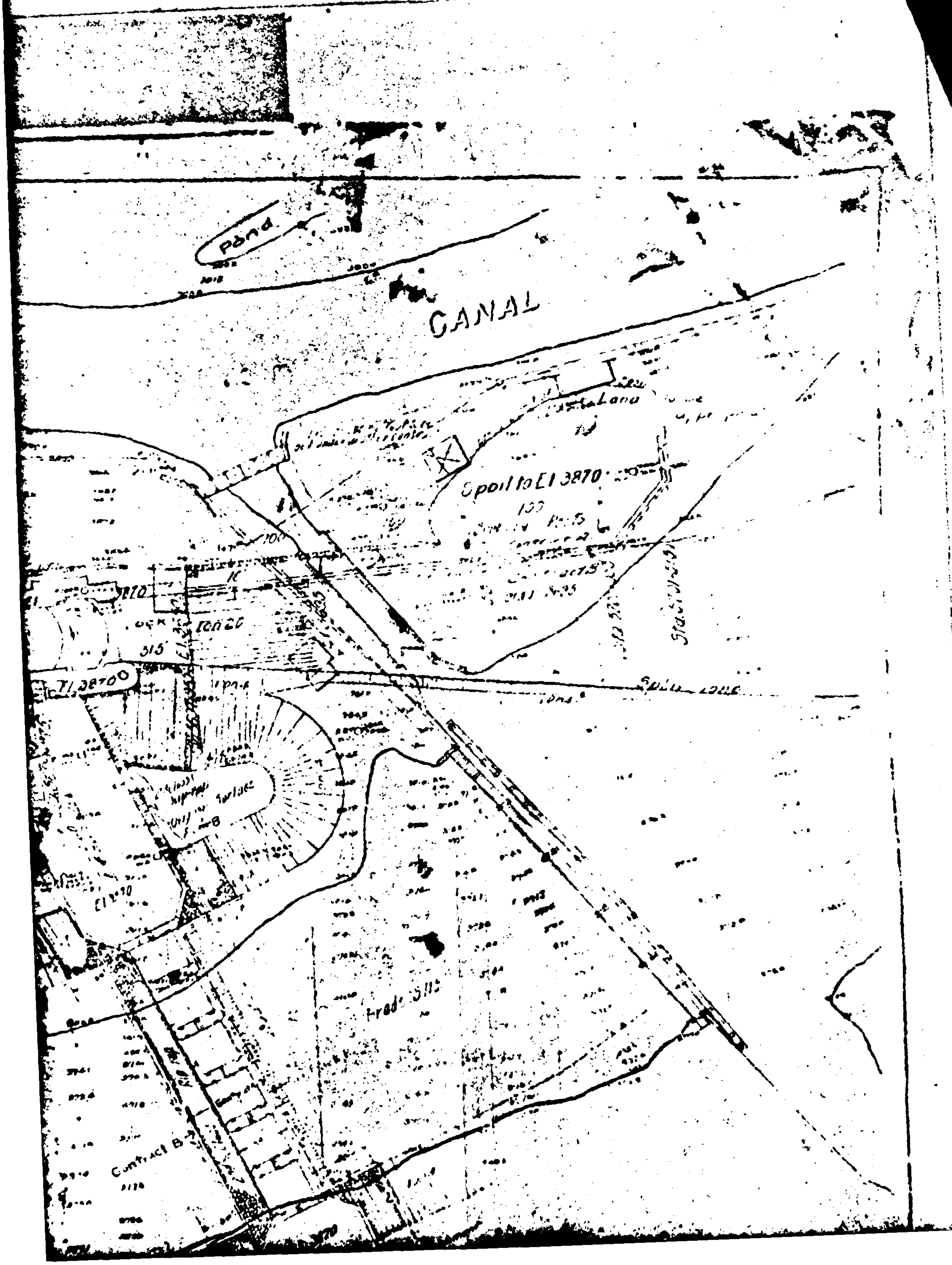
TOPOGRAPHIC MAP
MUD LOCK C&S CANAL DAM
I.D. NO. NY 416

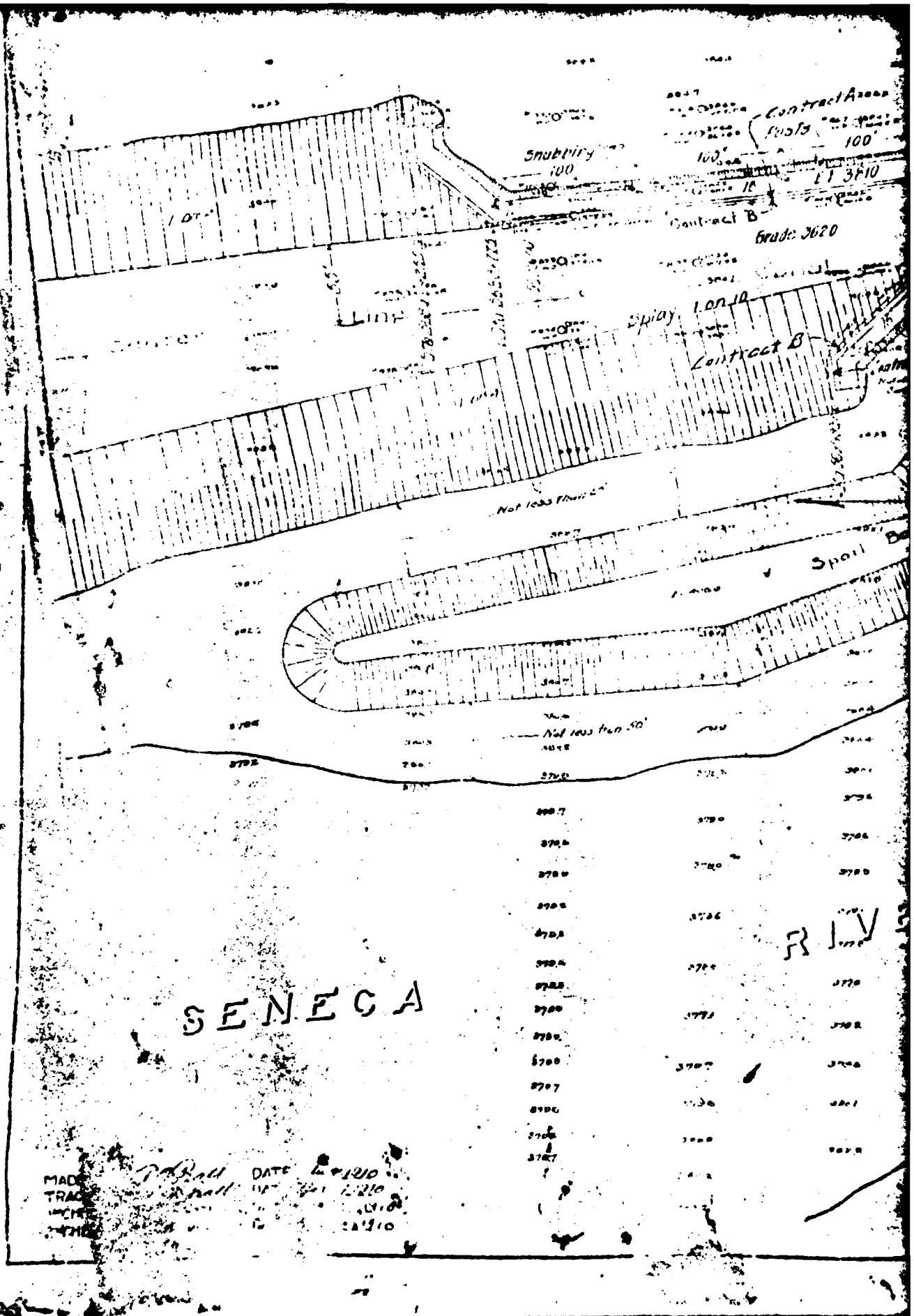
CAYUGA



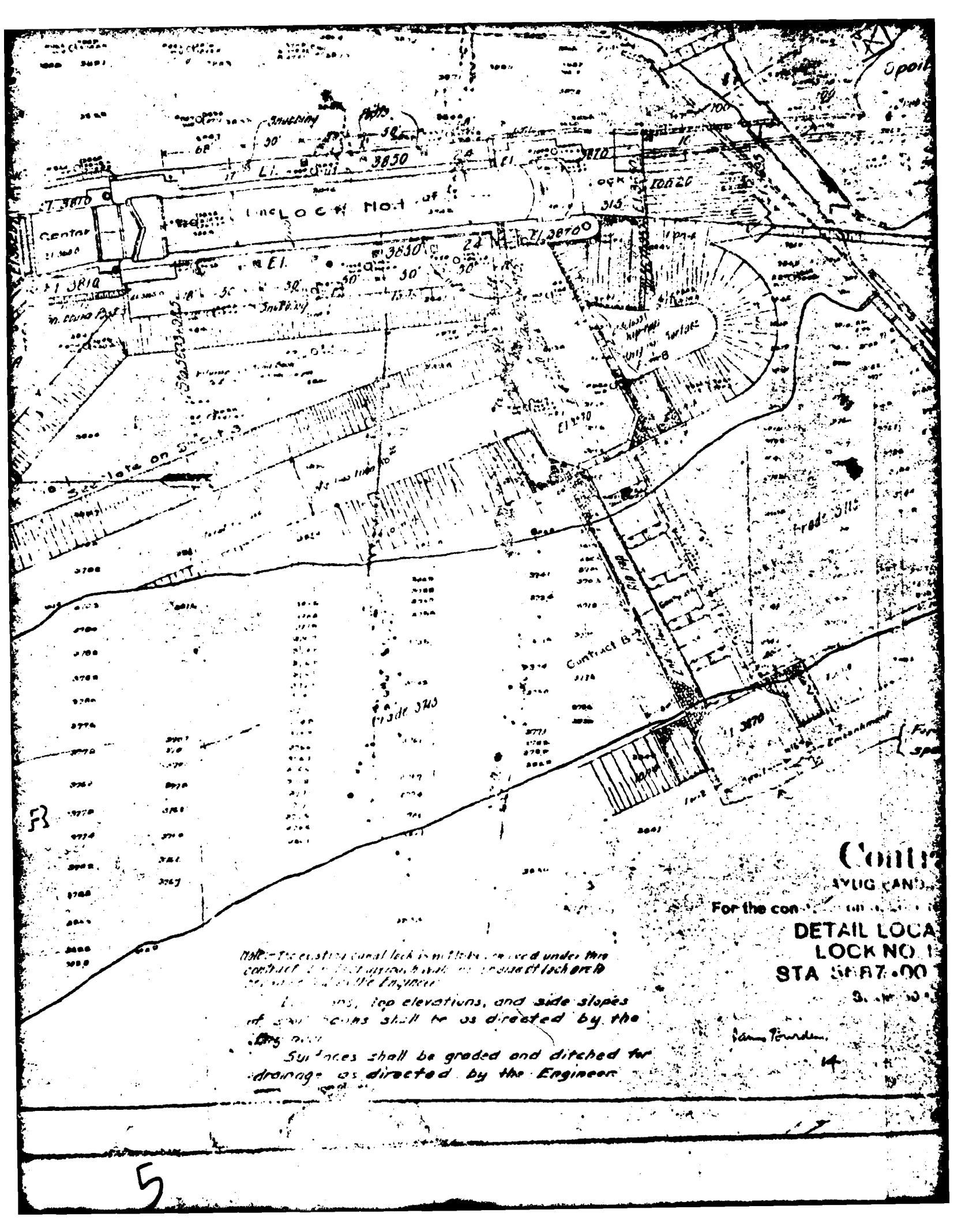
2

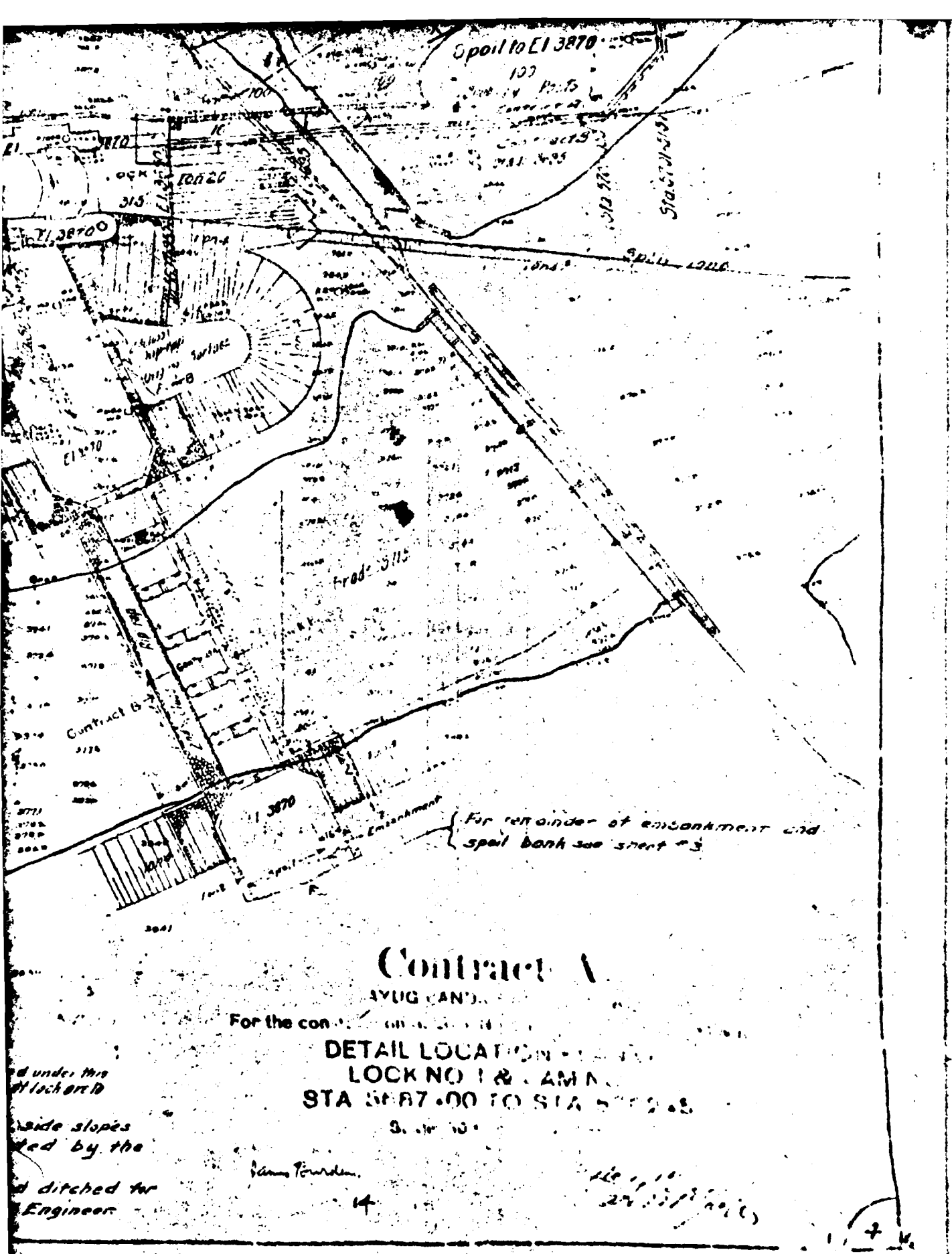



Pond
CANAL
Spoil to El 3870
Contract B


Contract A
Snubbing
100
100'
Contract B
Grade: 3620
Line
Spoil Land
Contract B
Not less than
Spoil
Not less than 50'
SENECA
RIV
DATE

4


Contract B
For the con
DETAIL LOCA
LOCK NO
STA
Surfaces shall be graded and ditched for drainage as directed by the Engineer.



Contract A

AVUG CANAL

For the con

DETAIL LOCAT

LOCK NO 1 & AMN

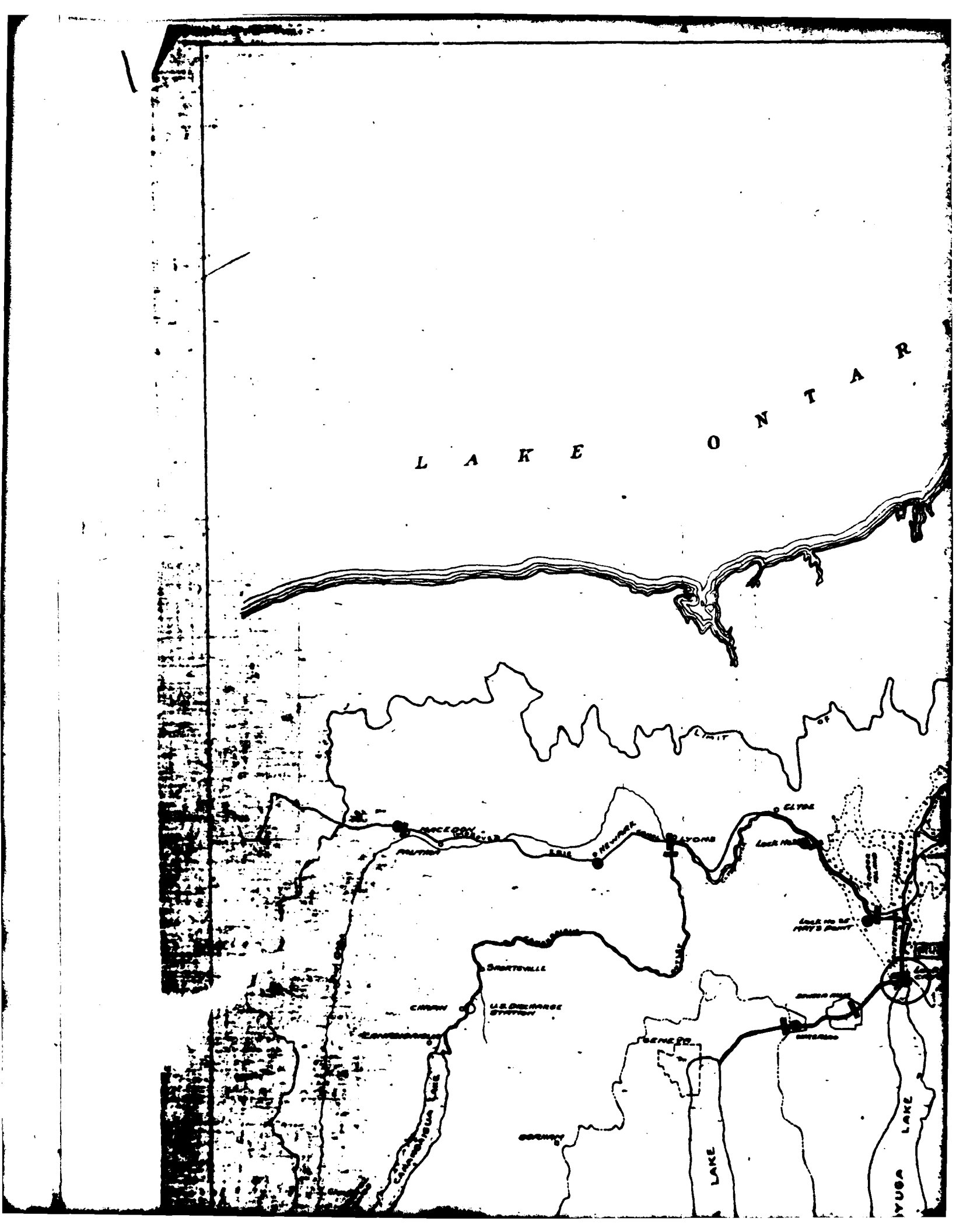
STA 87+00 TO STA

d under this
lock on D

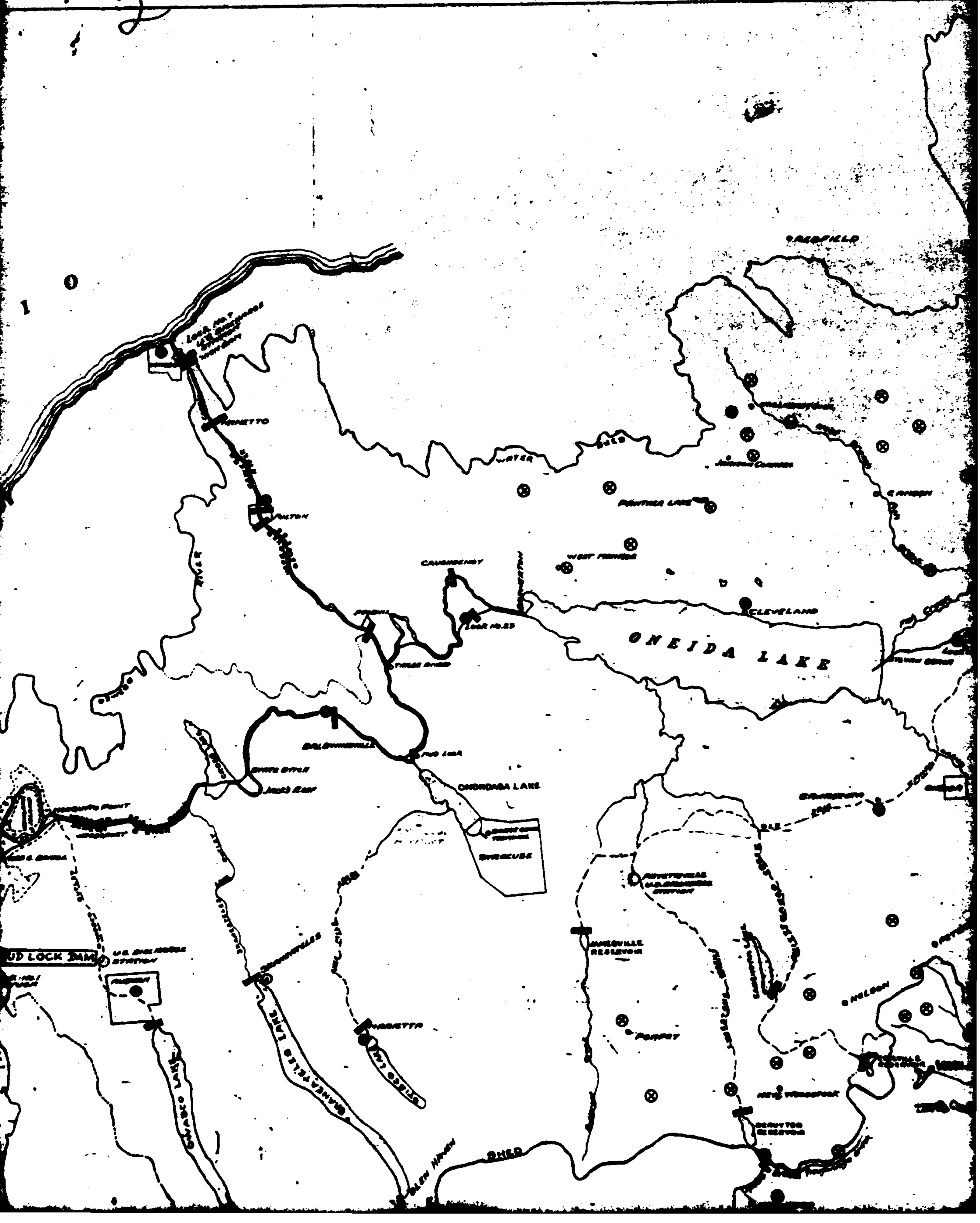
side slopes
ed by the

d ditched for
Engineer

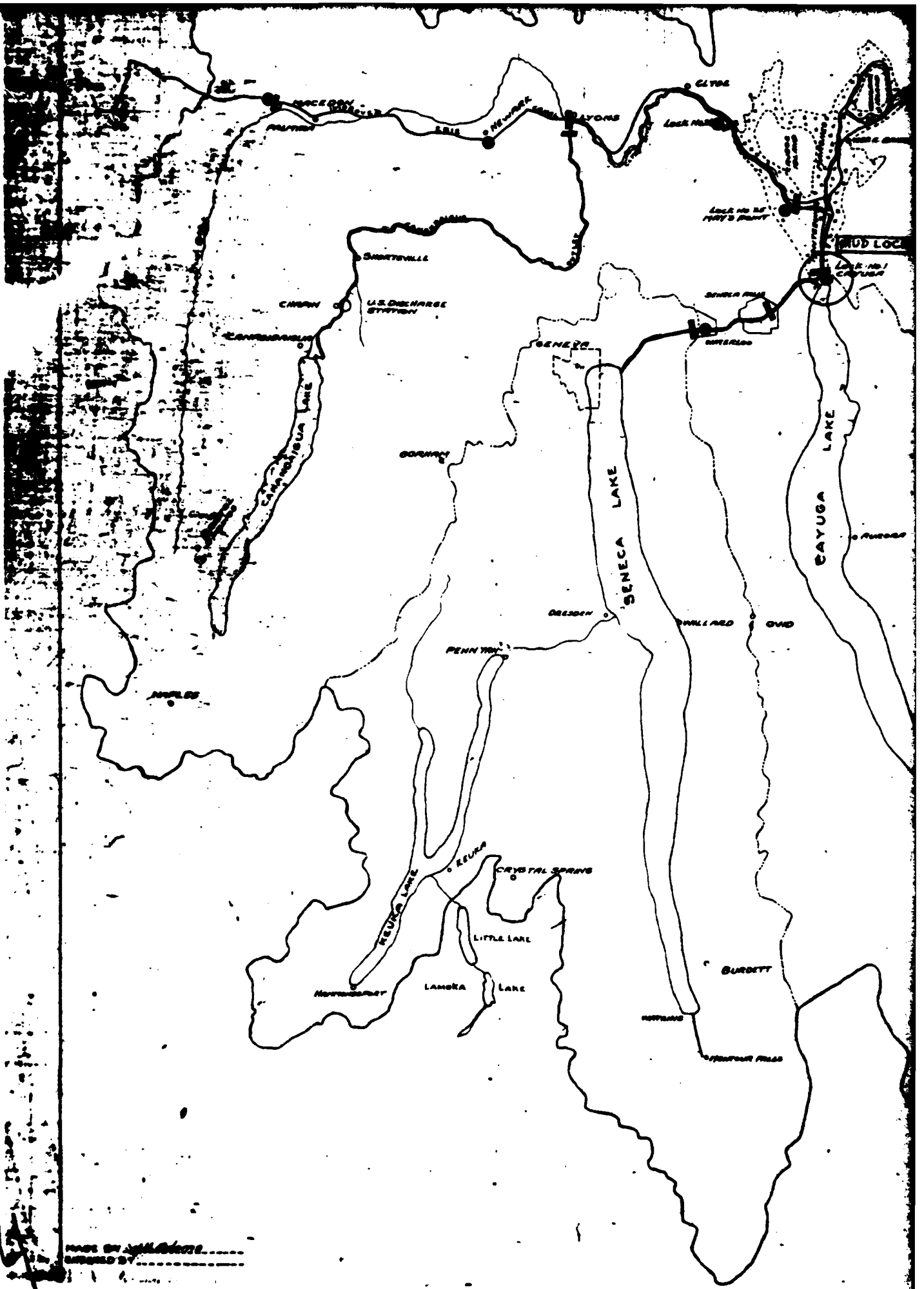
14

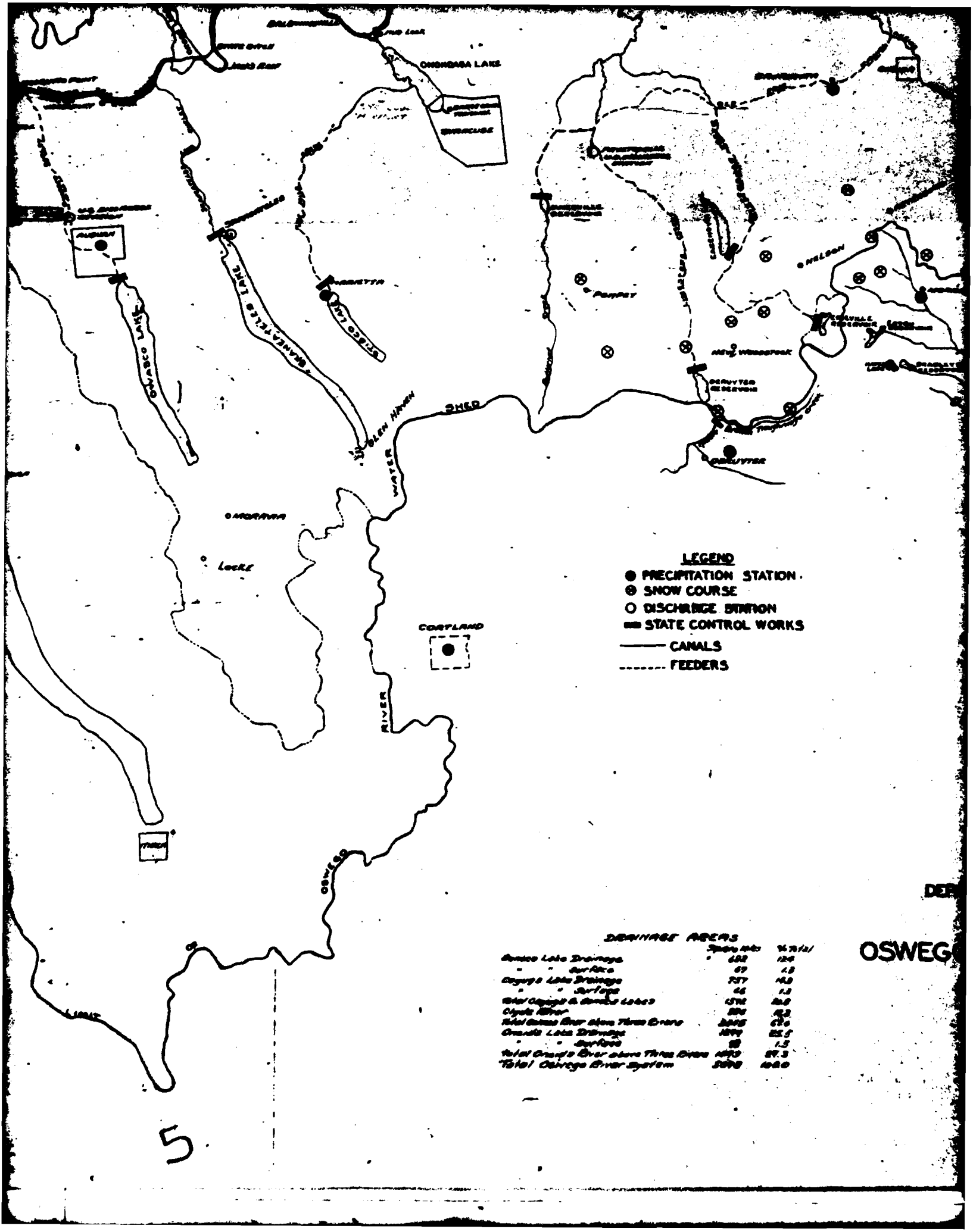

LAKE ONTAR
LIMIT OF
CLYDE
LAKE
LAKE

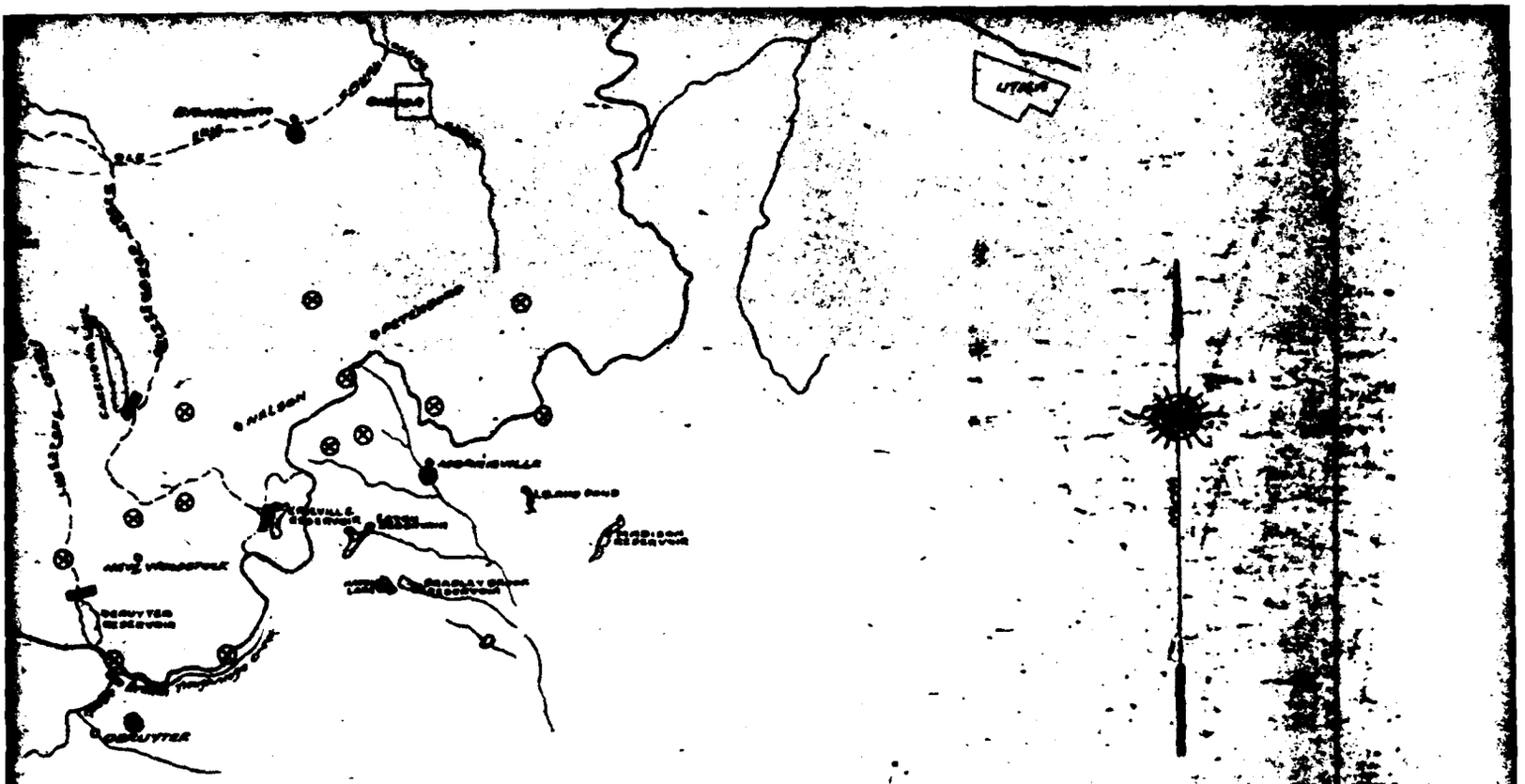
1 2


REDFIELD
CAMDEN
MINETTO
FULTON
WATER
SHED
CLEVELAND
ONEIDA LAKE
CAUGHDENOY
LOCK NO. 23
BALDWINSVILLE
ONONDAGA LAKE
SYRACUSE
UD LOCK DAM
JAMESVILLE RESERVOIR
POMPEY
NELSON
DERUYTER RESERVOIR
MARIETTA
OTISCO LAKE
SKANEATELES LAKE
OWASCO LAKE
GLEN HAVEN


3
PEORIA
CANTON
CLEVELAND
IDA LAKE
UTICA


SENECA LAKE
CAYUGA LAKE
CANANDAIGUA LAKE
KEUKA LAKE
LITTLE LAKE
LAMOKA LAKE
GENEVA
OVID
BURDETT
PENN YAN
CRYSTAL SPRING
U.S. DISCHARGE STATION


ONONDAGA LAKE
SYRACUSE
AUBURN
OWASCO LAKE
SKANEATELES LAKE
SENECA LAKE
GENEVA
PENFIELD
HONEOYE
HONEOYE RESERVOIR
CANANDAIGUA
GLEN HAVEN
WATER
SHED
MORAVIA
LOCKE
CORTLAND
RIVER
ITHACA
OSWEGO
LIMIT
LEGEND
PRECIPITATION STATION
SNOW COURSE
DISCHARGE STATION
STATE CONTROL WORKS
CANALS
FEEDERS
DRAINAGE AREAS
Owasco Lake Drainage
Cayuga Lake Drainage
Oneida Lake Drainage
Total Oswego River above Three Rivers
Total Oswego River System
OSWEGO
5



LEGEND

- CIPITATION STATION
- OW COURSE
- SCHARGE STATION
- ATE CONTROL WORKS
- CANALS
- FEEDERS

STATE OF NEW YORK

DEPARTMENT OF TRANSPORTATION

MAP OF

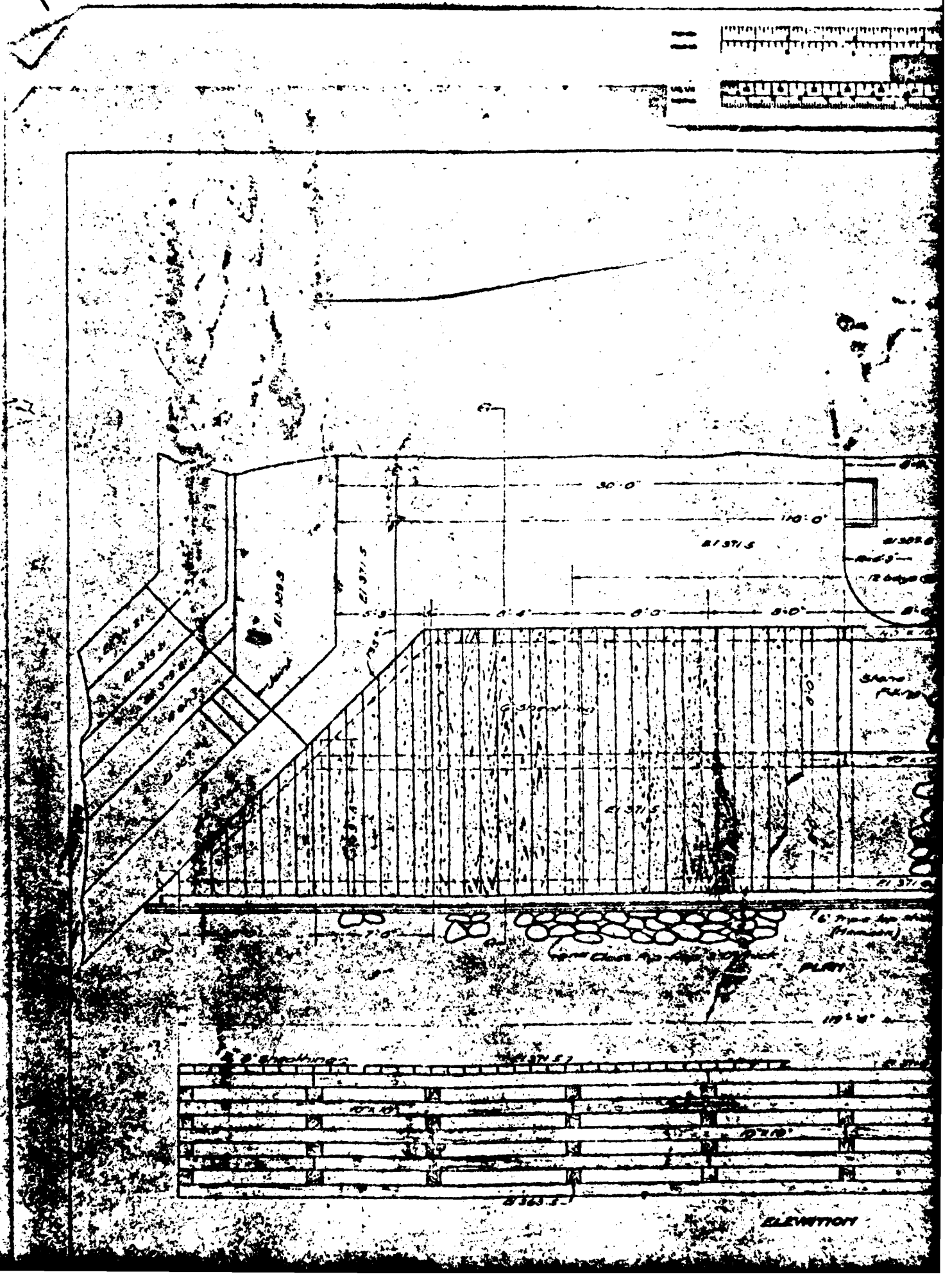
OSWEGO RIVER WATER SHED

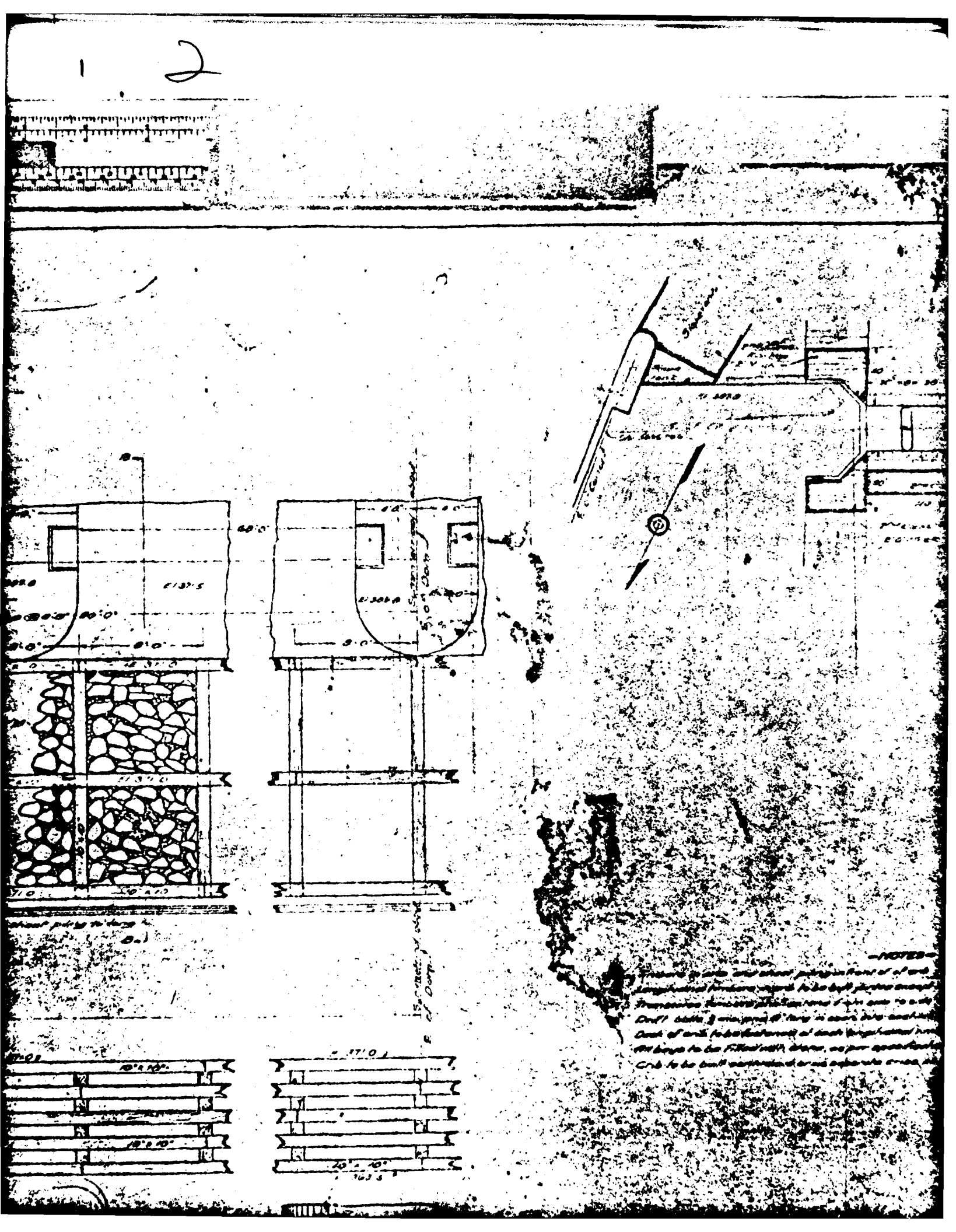
SCALE 1 INCH = 2 MILES

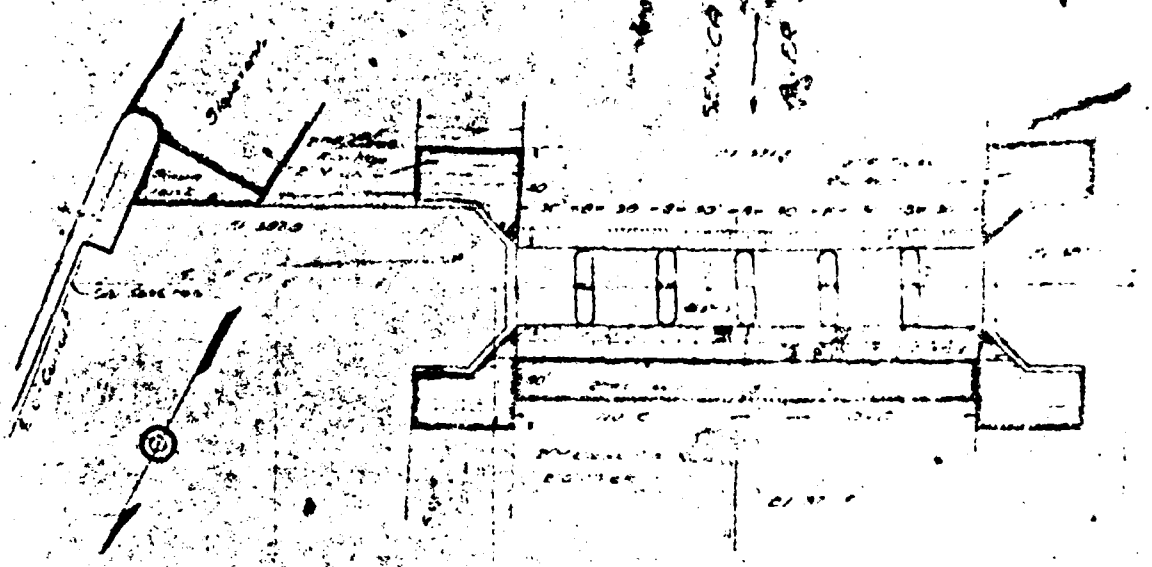
FEBRUARY 27, 1945

AREAS		

6


30'-0"
110'-0"
PLAN
ELEVATION

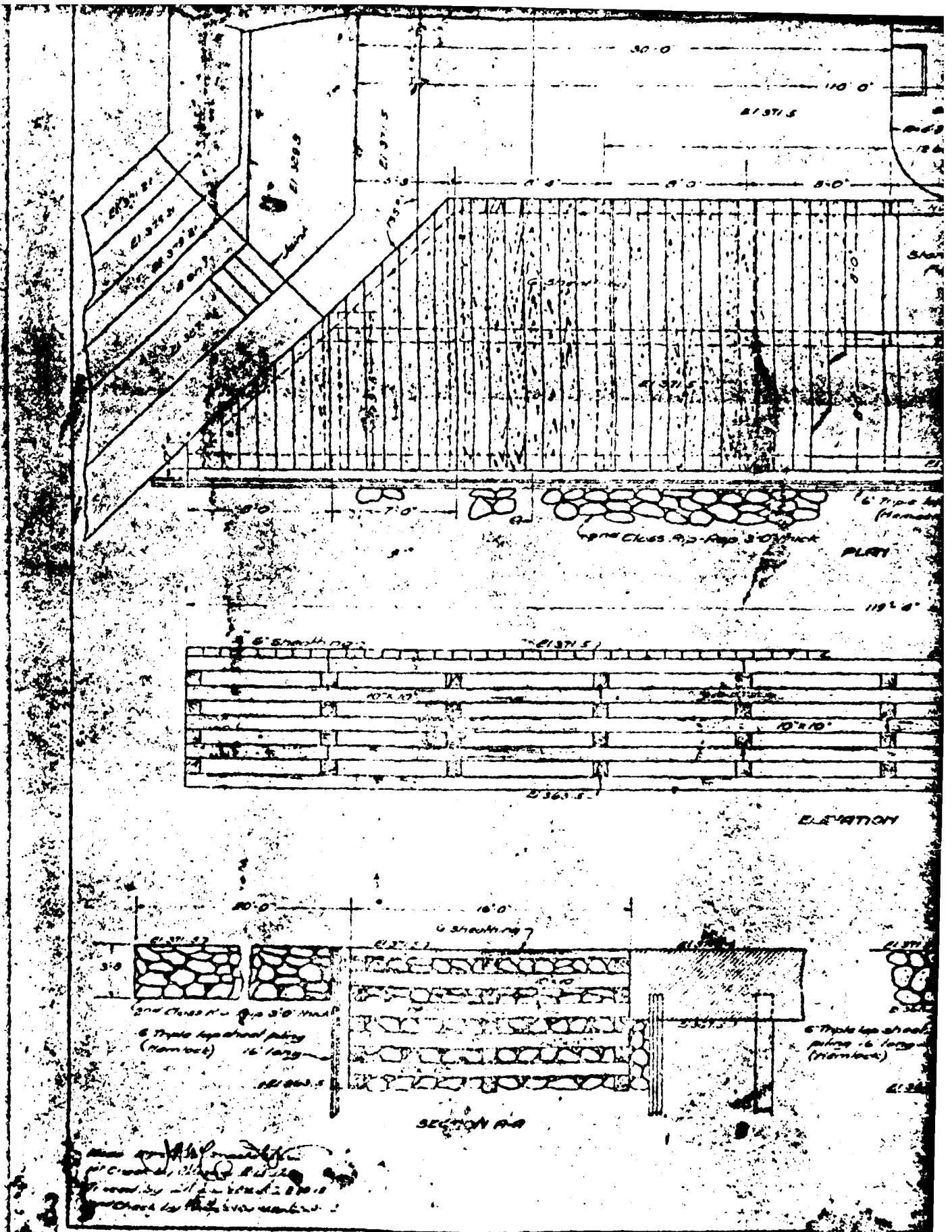


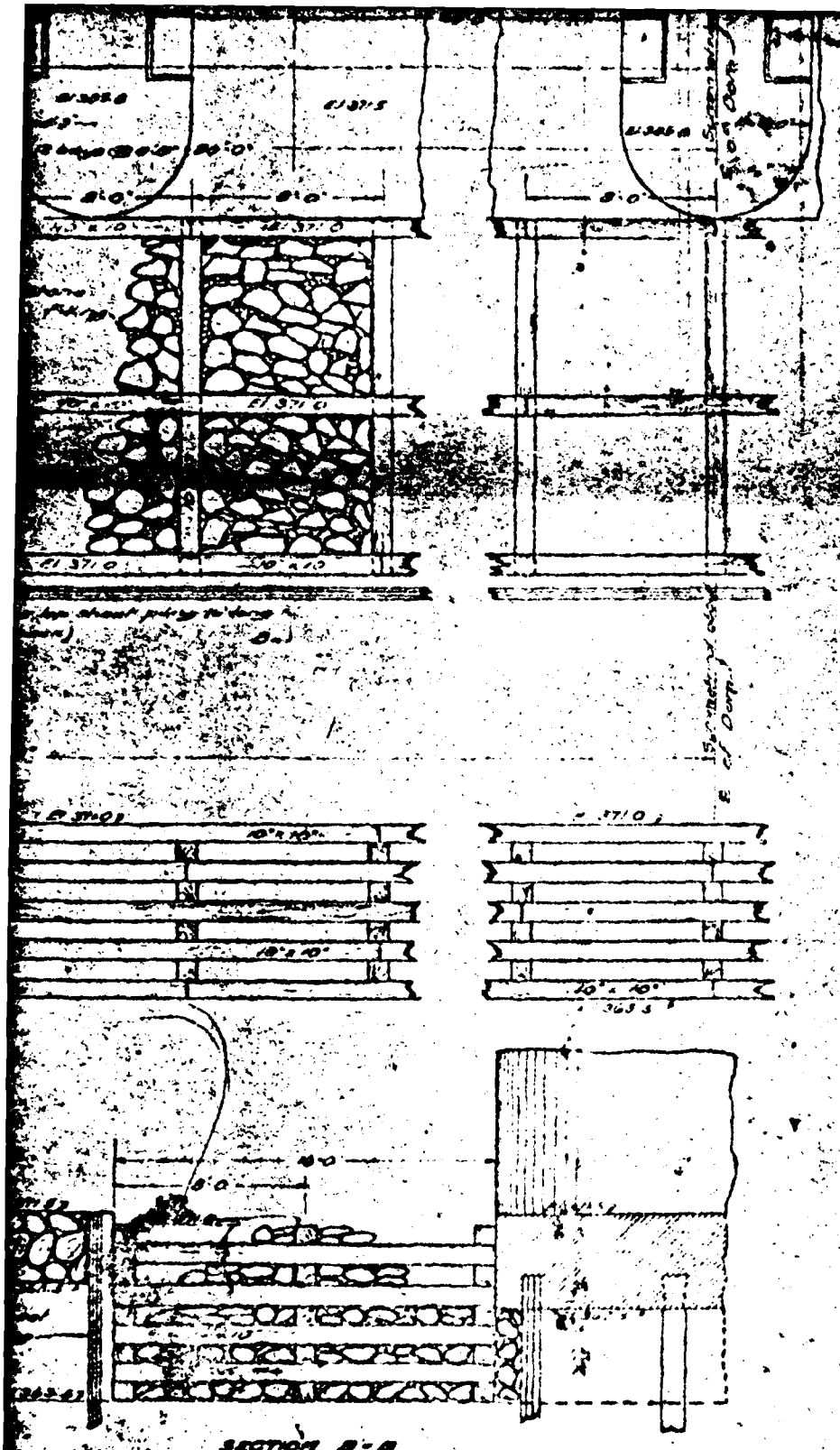


LOCATION PLAN

—NOTES—

Curb to be built continuous or as separate cribs, as determined by the Engineer


PLAN
ELEVATION
SECTION A-A



SECTION B-B
TOP REMOVED

Co

CAYUGA

PLAN & DET

A

Scal

Examined and approved

Assistant Engineer

5

LOCATION PLAN

-NOTES-

Contract A.

ALTERATION NO. 2

CAYUGA AND SENECA CANAL

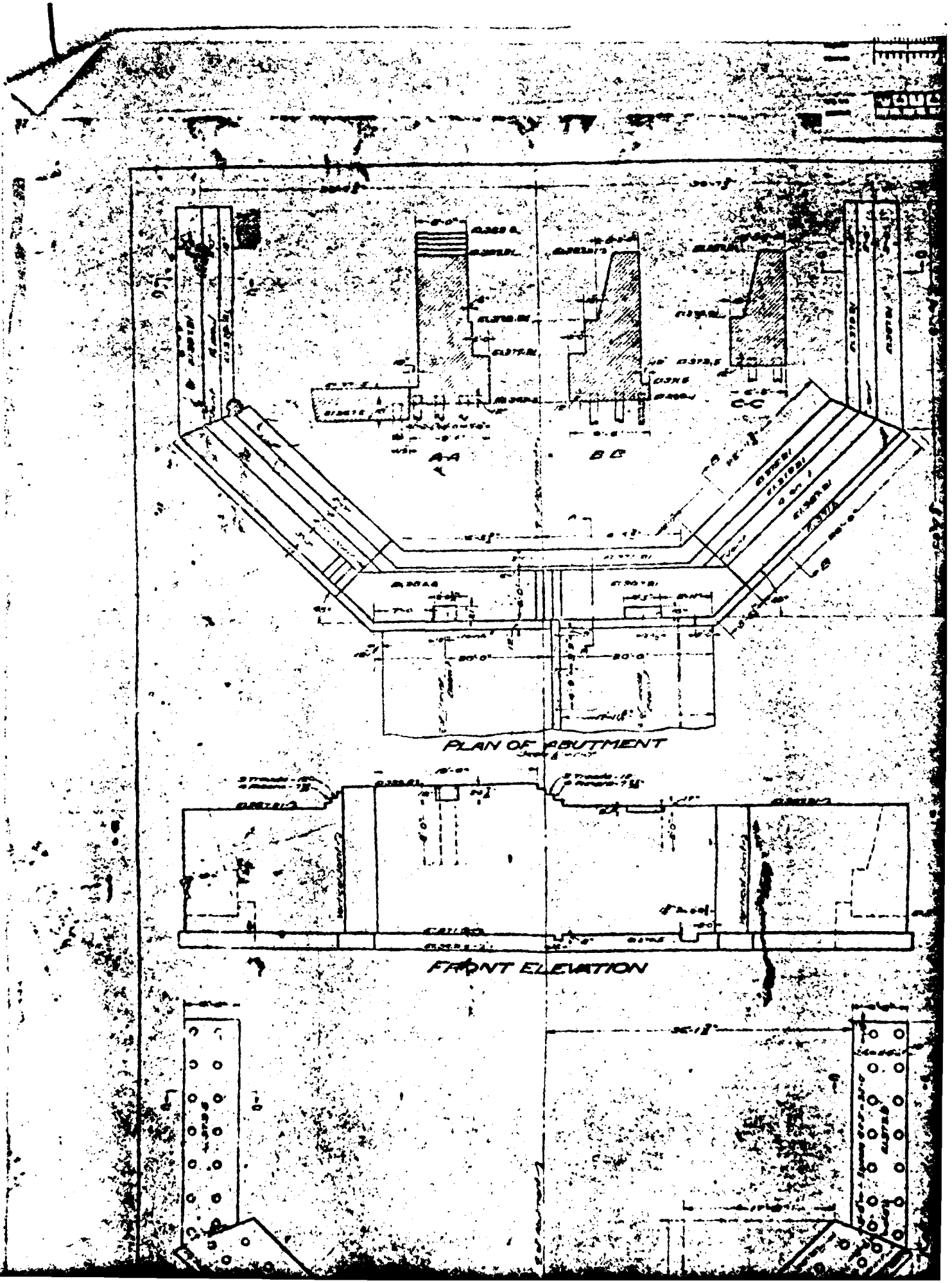
PLAN & DETAILS OF TIMBER CRIB AT DAM NO. 1

Scale: 4 feet to the inch
except as indicated

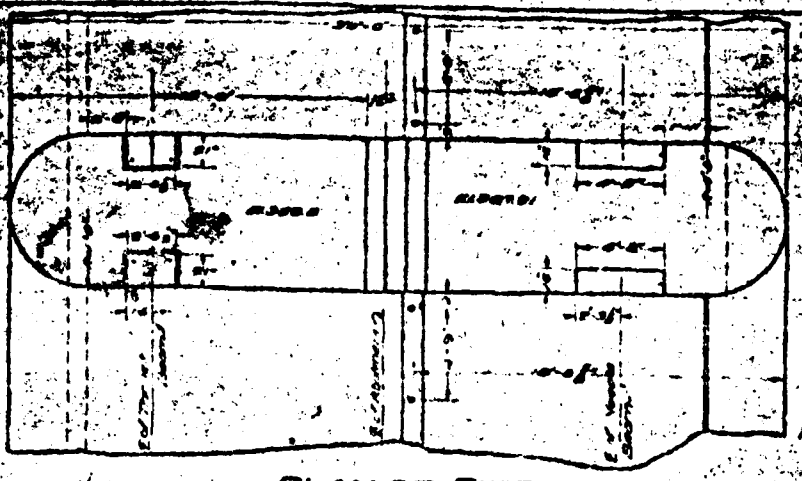
Examined and approved

Examined and approved

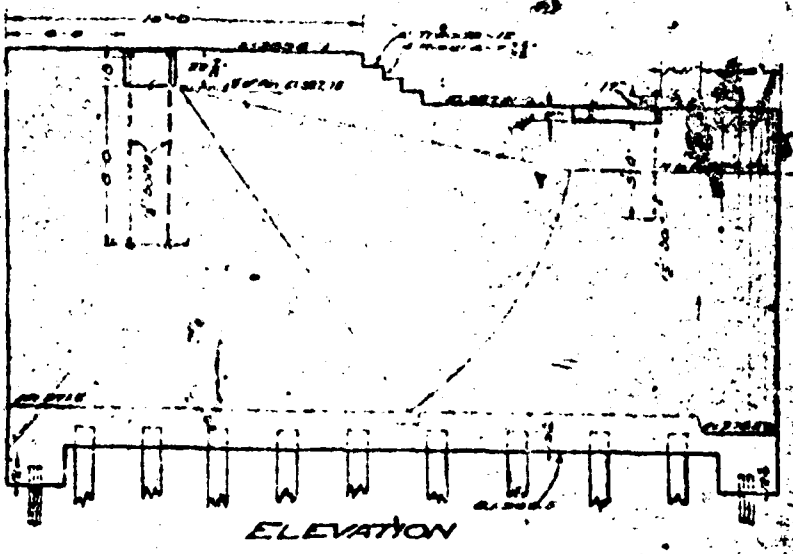
137


A-A
B-C
PLAN OF ABUTMENT
FRONT ELEVATION

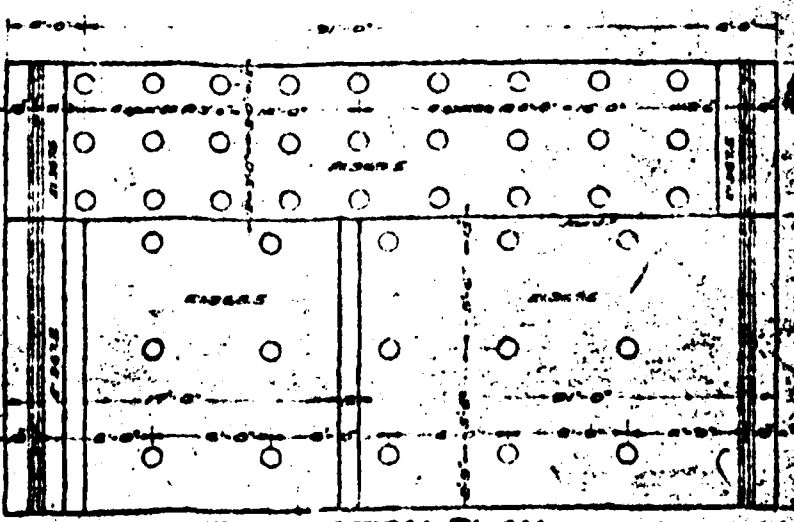
2



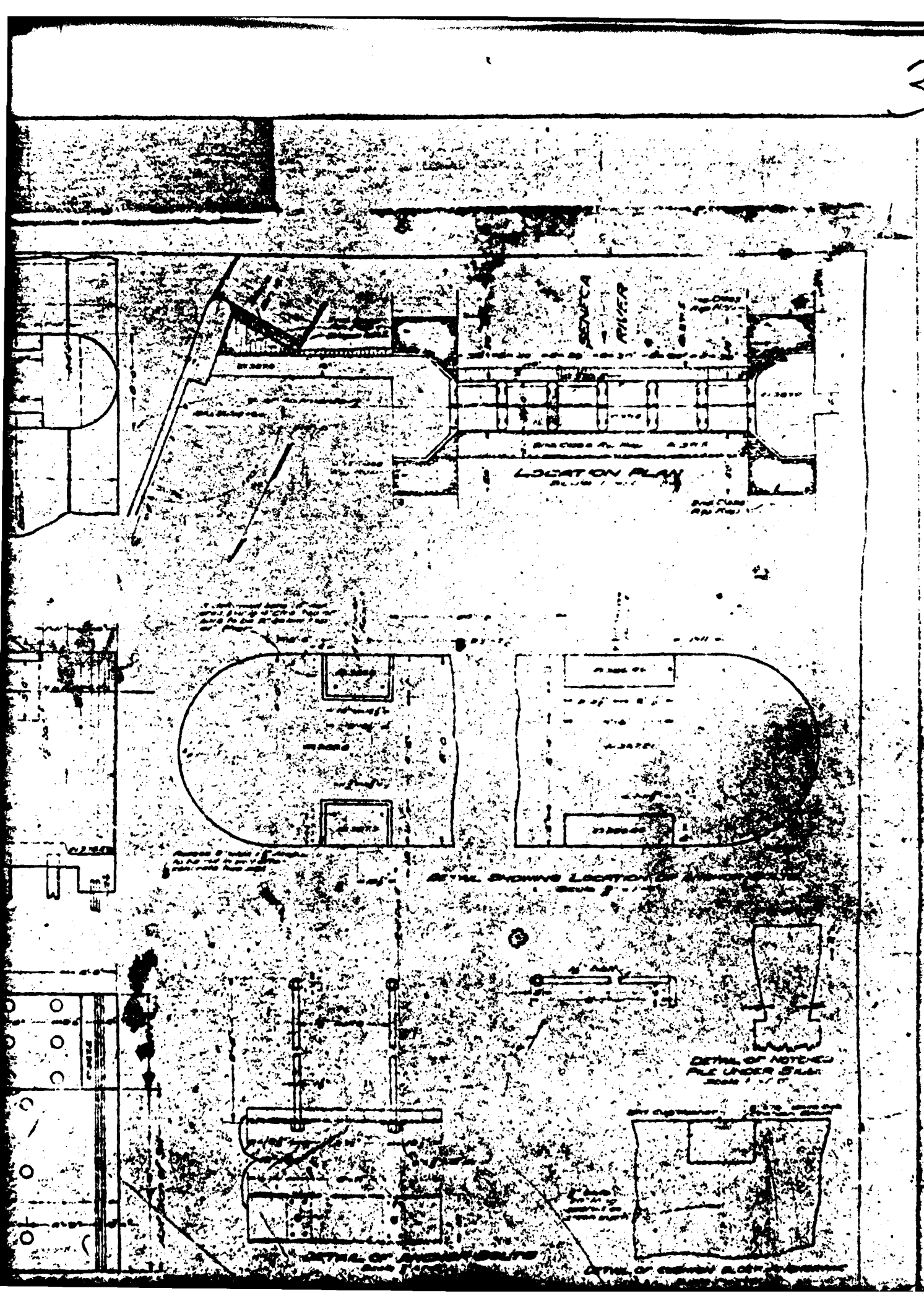
PLAN OF PIER

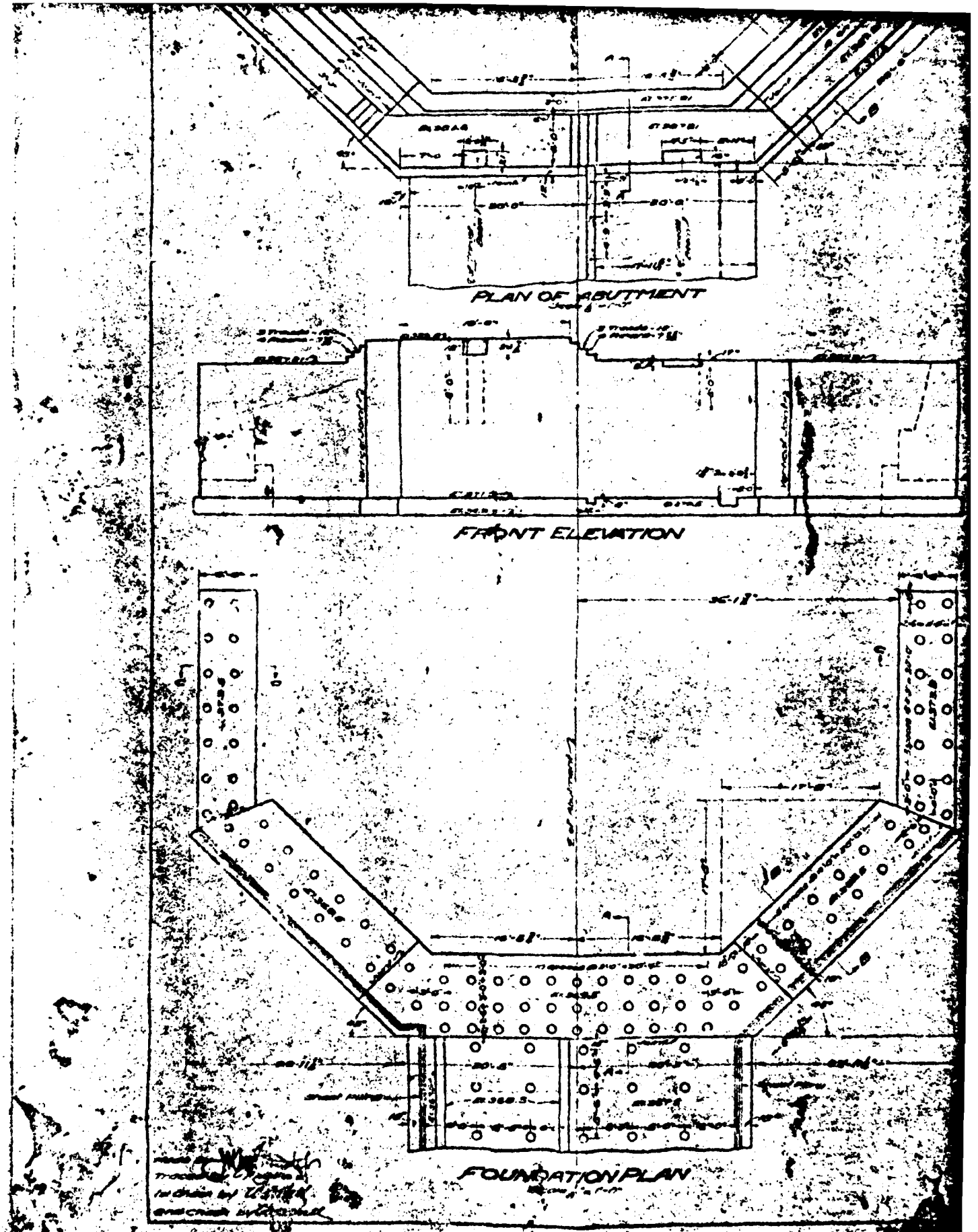


ELEVATION

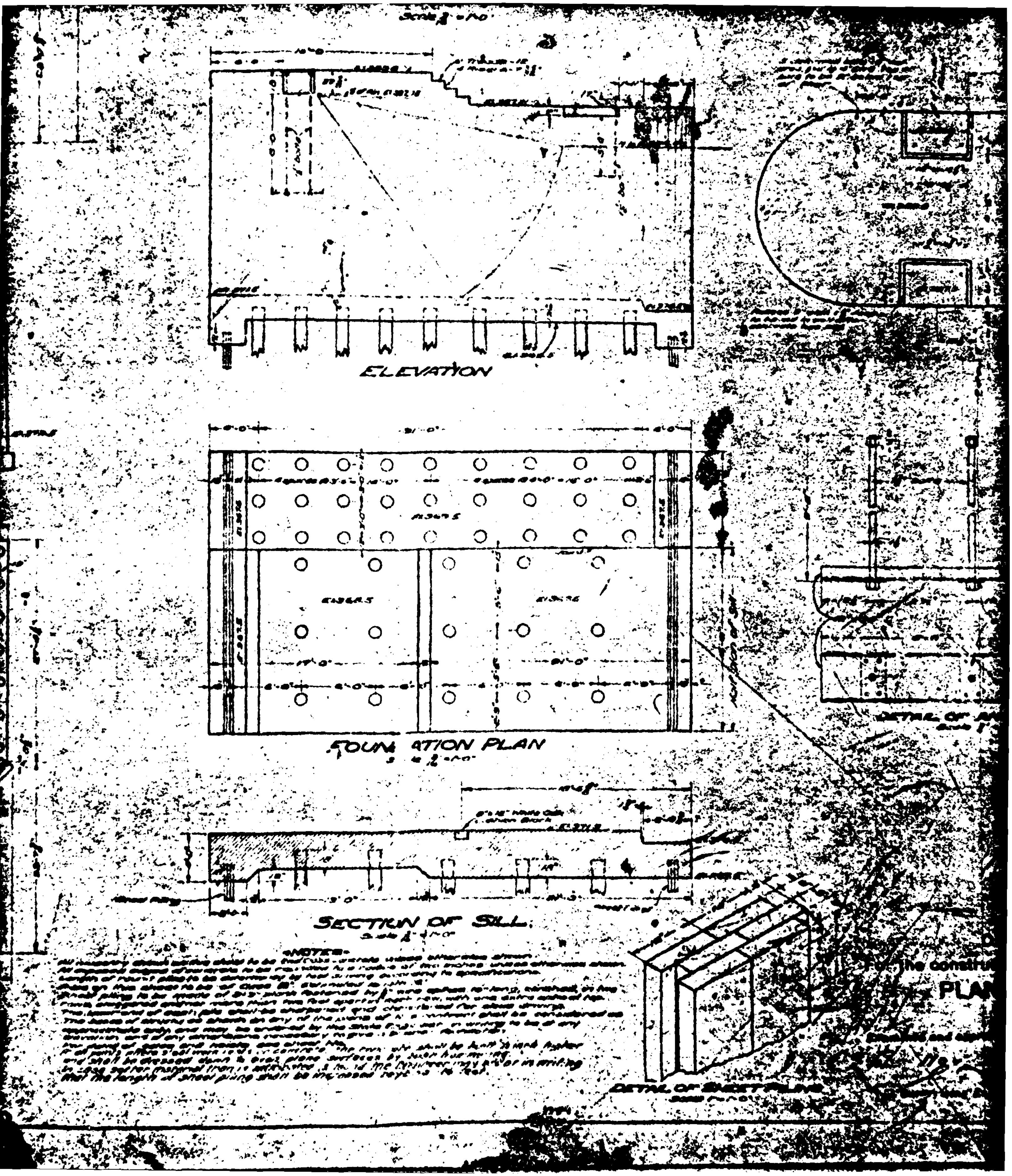


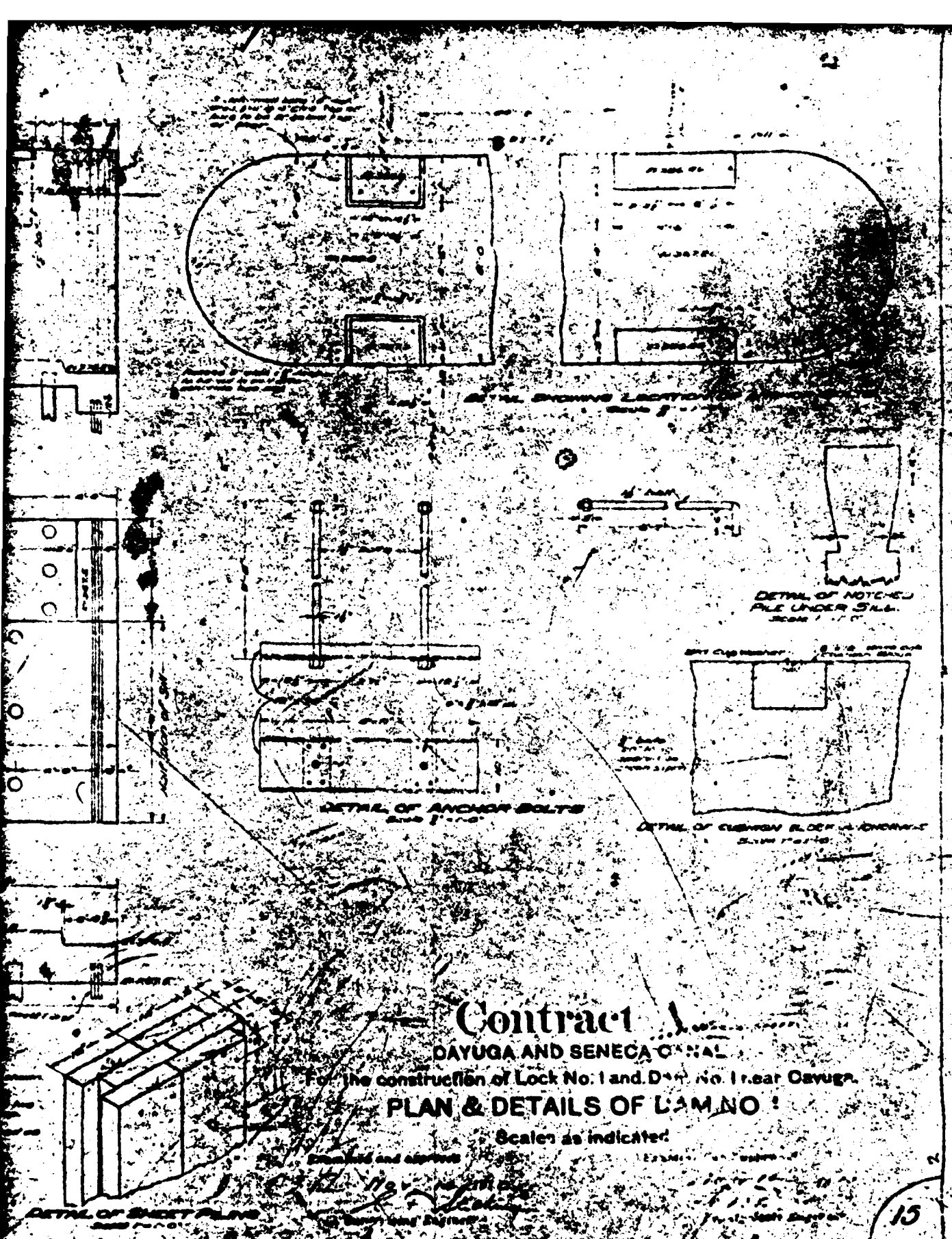
FOUNDATION PLAN


SENECA RIVER
LOCATION PLAN
DETAIL OF NOTCHED PILE UNDER SLAB



4


ELEVATION
FOUNDATION PLAN
SECTION OF SILL
NOTES
DETAIL OF SHEET PILING
PLAN



Contract 1

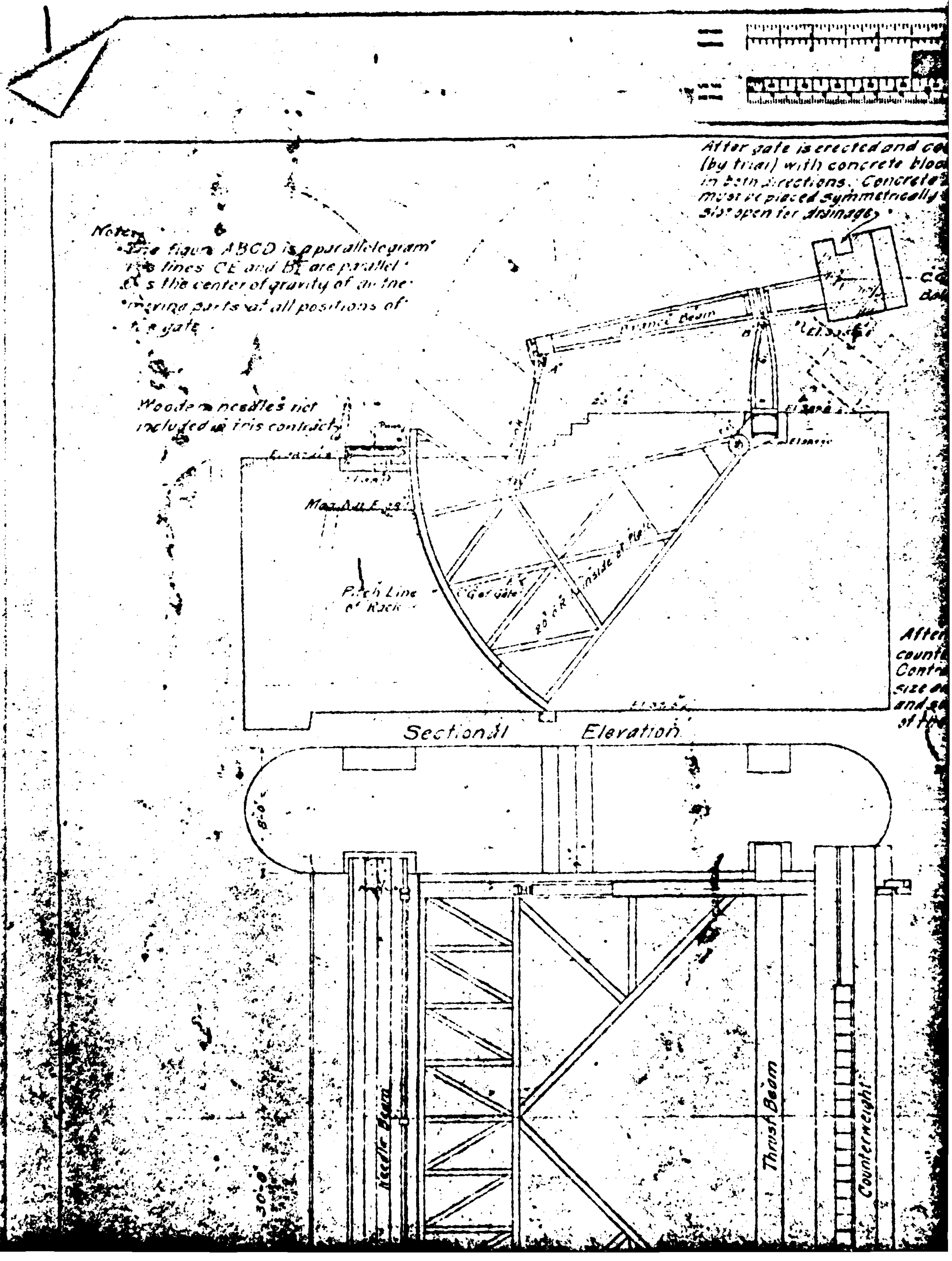
CAYUGA AND SENECA CANAL

For the construction of Lock No. 1 and Dam No. 1 near Cayuga.

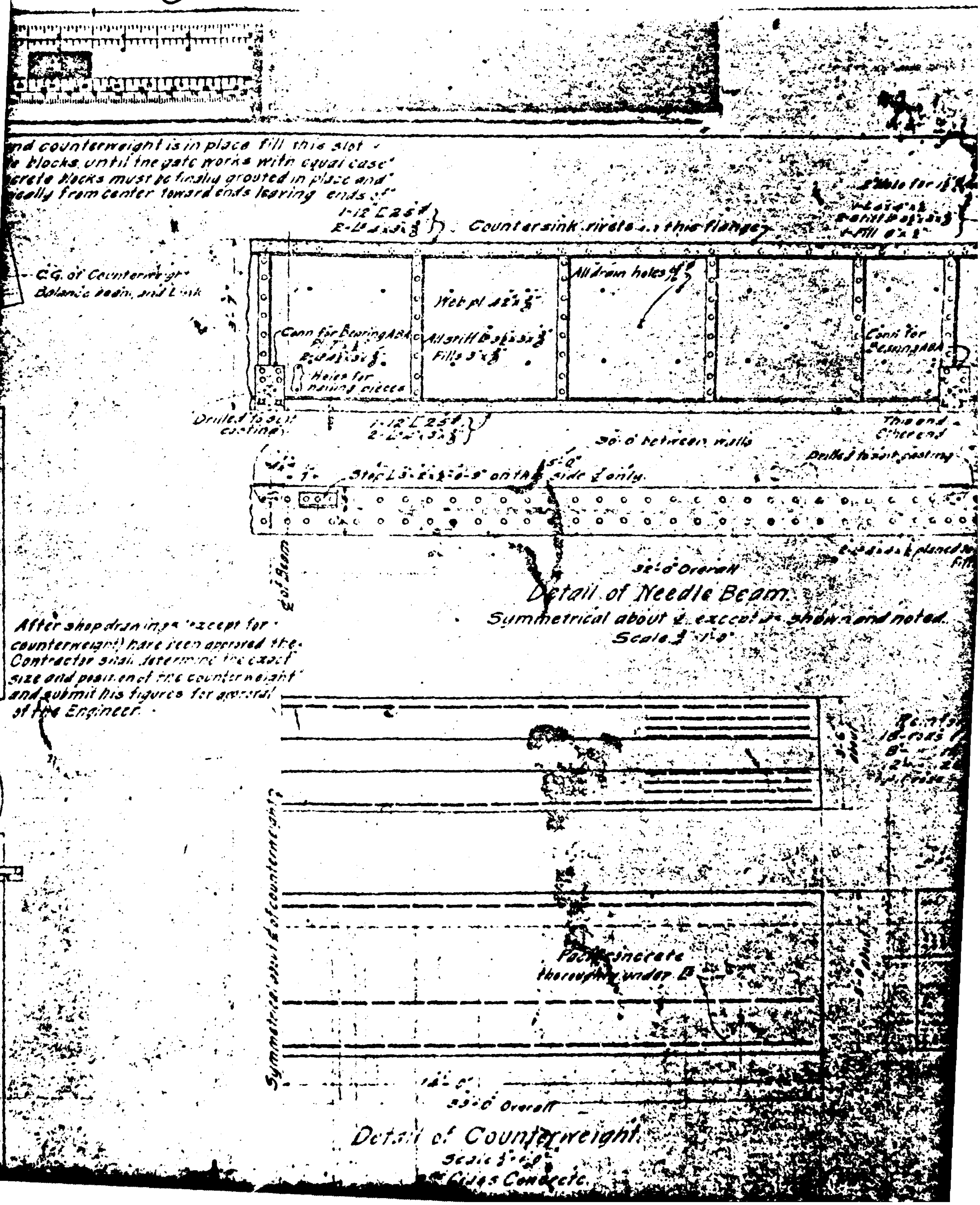
PLAN & DETAILS OF DAM NO 1

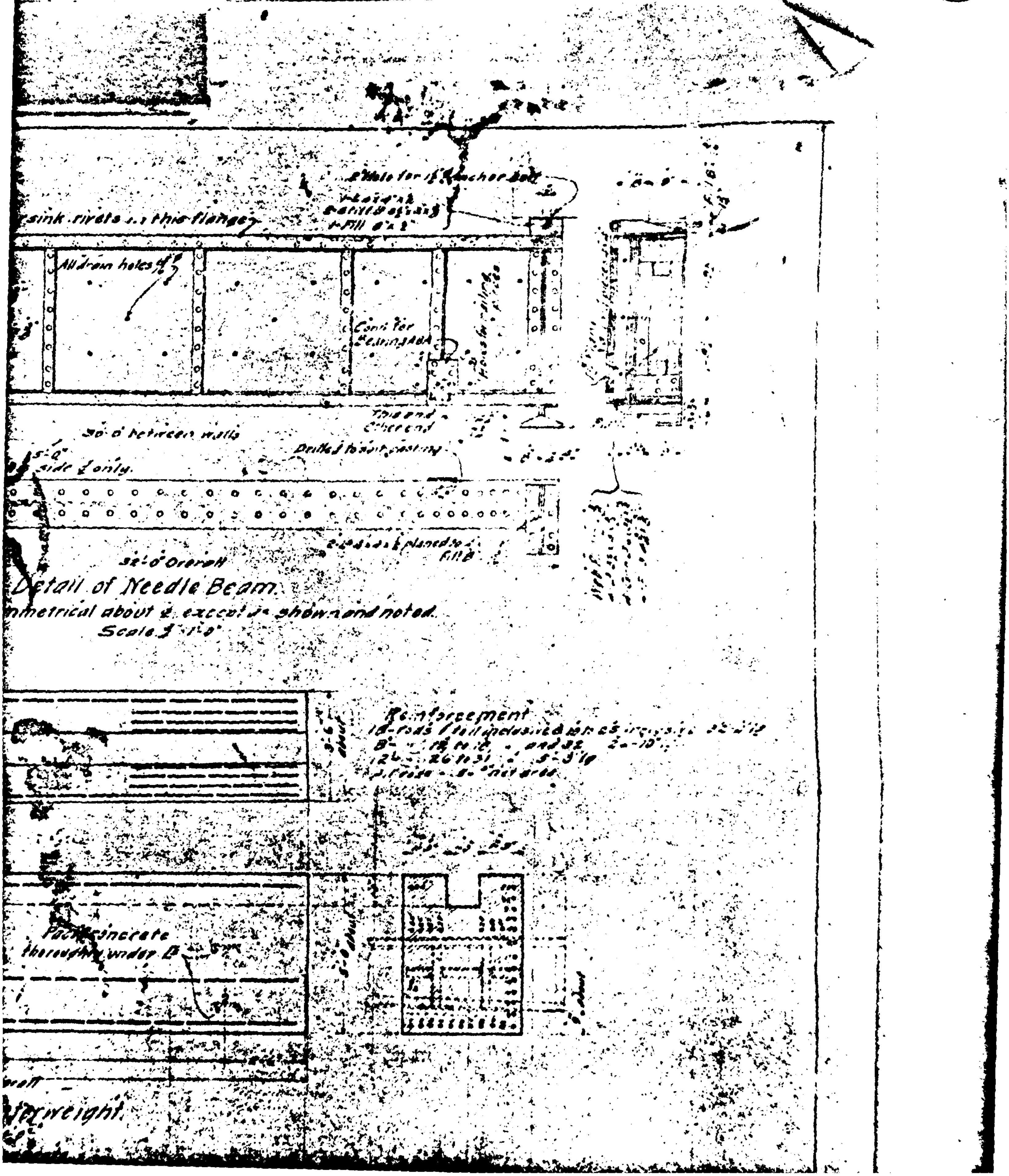
Scales as indicated

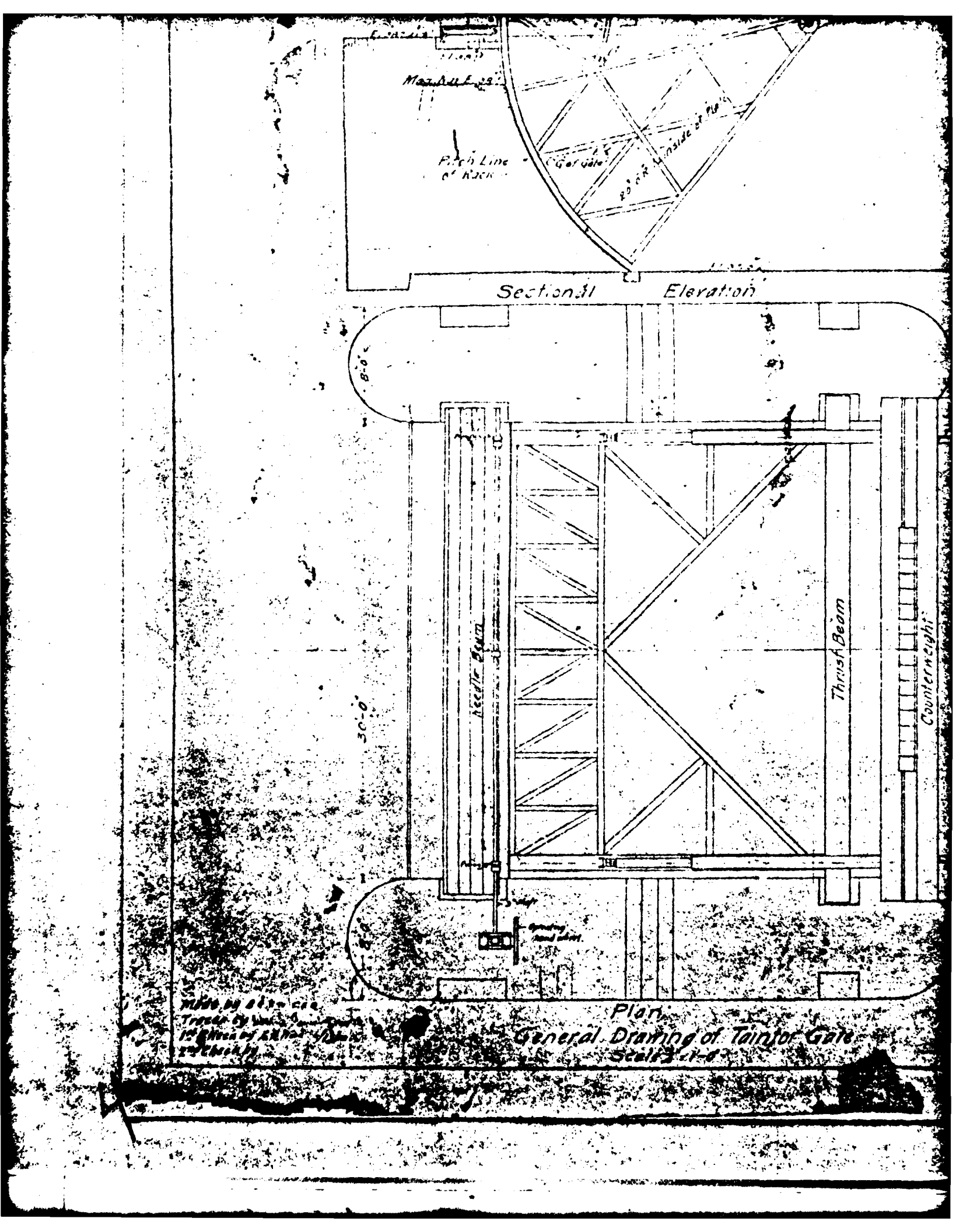
15


Notes
Wooden needles not included in this contract
Max. W. El.
Pitch Line of Rack
Sectional Elevation
8'-0"
30'-0"
Needle Beam
Thrust Beam
Counterweight

2


nd counterweight is in place fill this slot
e blocks until the gate works with equal ease
crete blocks must be firmly grouted in place and
ically from center toward ends leaving ends
Countersink rivets in this flange
C.G. of Counterweight
Balance beam and Link
Web pl
All drain holes
Conn for Bearing
Holes for nailing pieces
Drilled to suit casting
30'-0" between walls
32'-0" Overall
Detail of Needle Beam.
Symmetrical about ℄ except as shown and noted.
After shop drawings (except for counterweight) have been approved the Contractor shall determine the exact size and position of the counterweight and submit his figures for approval of the Engineer.
Symmetrical about ℄ of counterweight
Pack concrete thoroughly under
Detail of Counterweight.


sink rivets in this flange
All drawn holes
30'0" between walls
side ℄ only
Drilled to suit casting
32'0" Overall
Detail of Needle Beam.
mmetrical about ℄ except as shown and noted.
Reinforcement
weight.



General Drawing of Tainter Gate

Step L 3-6 x 1-6 x 0-9 on this side only.

32'-0" Overall

Detail of Needle Beam.

Symmetrical about ℄ except as shown and noted.

Scale 3"=1'-0"

After shop drawings except for counterweight have been accepted the Contractor shall determine the exact size and position of the counterweight and submit his figures for approval of the Engineer.

Pack concrete thoroughly under C

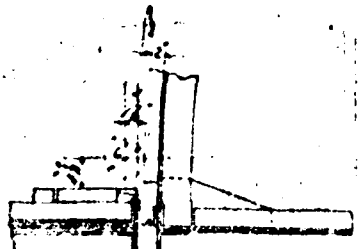
12'-0"

33'-0" Overall

Detail of Counterweight.

Scale 3/4"=1'-0"

2nd Class Concrete



Sketch showing highest Position of Gate

Scale 1/2"=1'-0"

Cont

OAYUGA AND

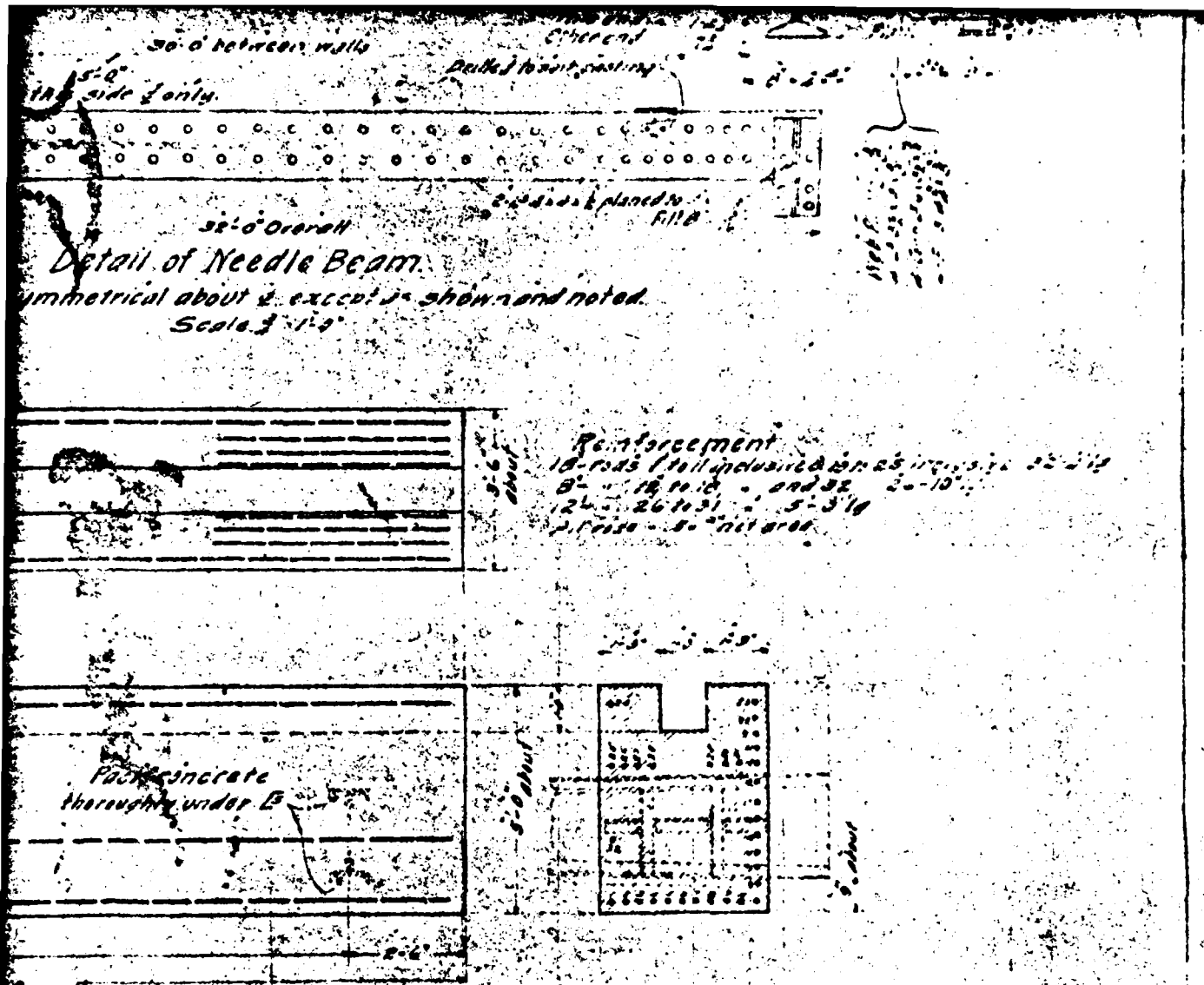
For the construction of Lock

ASSEMBLY PLA

Scale

Examined and approved

5



Contract A.

CAYUGA AND SENECA CANAL

For the construction of Lock No. 1 and Dam No. 1 near Cayuga

ASSEMBLY PLAN OF TAINTOR GATE

Scales as indicated

Examined and approved

Chief Engineer and Inspector

Examined and approved

Supt. of Construction

1919